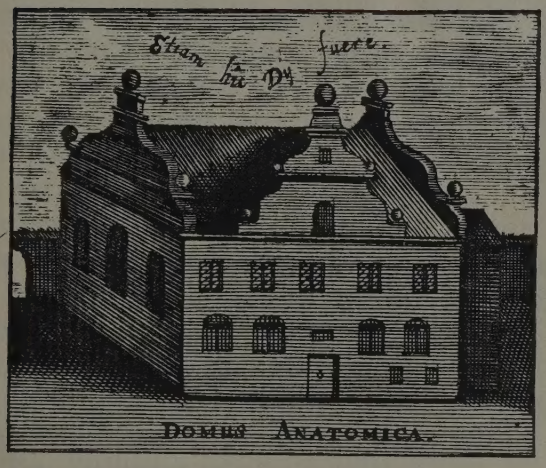
NICOLAI STENONIS
OPERA PHILOSOPHICA

EDITED BY
VILHELM MAAR

At the Expense of the Carlsbergfond.

VOL. I



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LIFE AND WORKS
OF
NICOLAUS STENO

I

NICOLAUS STENO[1] was born in Copenhagen, the capital of Denmark, in 1638. His father was a well-to-do and intelligent tradesman of a respectable family, who in his capacity of jeweller did much work for the Danish King, *Christian IV*. When a boy *Steno* was of delicate health, and he himself relates how he would much rather listen to the discourse of grown-up people, than play with children of his own age. He received a liberal education, and in the grammar-school, which he frequented, he had, besides the headmaster *Jørgen Eilersen (Georgius Hilarius)* several able teachers, among whom was the young and clever, later on so well-known *Ole Borch (Olaus Borrichius)*. The latter was deeply interested in medicine and natural science, especially chemistry, to the study of which he made valuable contributions; at the same time he was a prominent philologist, and was early appointed Professor at the University of Copenhagen. He spent some time in Holland, where he met with *Steno,* who often mentions him in his Treatises and Letters, and with whom he always remained on intimate terms.

Copenhagen 1638–1660.

In 1656 *Steno* entered the University of his native town, where he began to study medicine in connection with the related branches of natural science. At the University of Copenhagen these studies were at this period pursued with great zeal and ability by a series of great scholars, the members of a few prominent families. Among the most renowned, some of whom, however, were dead at the time of *Steno's* entering upon his studies, may be mentioned the physical philosopher *Jacob Finke;* the astronomer *Christen Longomontanus*, the pupil and co-operator of *Tycho Brahe;* and the physicians *Casper Bar-*

[1]) The Danish form of this name is *Niels Steensen*, while the latinized form, generally used by its owner, was *Nicolaus Stenonis*. The form *Stenonius* also frequently occurs as well as the French *Sténon* and the Italian *Stenone*. The form usually adopted in our days is *Steno*, which is due to the erroneous conception that *Stenonis* was really the genitive case of a name *Steno*.

tholin the elder, *Ole Worm* and *Jørgen Fuiren,* to which list must still be added, perhaps as the most celebrated of them all, the physician and anatomist, *Thomas Bartholin,* the son of *Casper Bartholin;* also *Simon Paulli,* the anatomist, called in from Rostock, who eventually gave himself up to botanical studies; and finally, besides several others, the above-mentioned *Ole Borch.*

Steno's studies at the University were anything but quiet and regular. Denmark was at that time at war with Sweden, and Copenhagen was being besieged by the Swedish King, *Carl X Gustaf.* The students of the University distinguished themselves by the way in which they took part in the defence of the city, but lectures at the University were partly, and for a time altogether, suspended.

Amsterdam 1660.

Before the official conclusion of peace, *Steno,* in accordance with the prevailing custom of the times, went abroad to continue his studies at foreign universities. He first visited Amsterdam, to where he had been supplied with letters of introduction by *Thomas Bartholin.* The latter had already long been enjoying a European reputation, and through his travels abroad and his extensive correspondence, partly published later on, he was in close contact with the world of learning of those days. In spite of his great credulity, which credulity often led him astray, and in spite of having to share the honour of his one great discovery, *viz.* that of the lymphatic vessels, as well with *Michael Lyser,* his prosector, as with *Olof Rudbeck* of Upsala, this remarkable man had yet founded a great school and had besides in various ways given a vigorous impetus to the scientific life of his own country. At an early period he had recognized *Steno's* intellectual gifts, and he always estimated him according to his merits. He recommended *Steno* to his friend and relative, *Gerard Blaes,* a well-known scholar of those days, Professor at the High School of Amsterdam *(Athenæum),* as well as Director of the Town Hospital *(Het Gasthuis). Blaes* invited *Steno* to his house, and with him *Steno* lived during the four months he spent in Amsterdam.

Though only of short duration this stay was nevertheless of the greatest importance to *Steno,* not only because of the general impressions which he received through living in a great centre of civilization, such as Amsterdam was in those days, but also because he became personally acquainted with men of great learning and culture, among whom were the two renowned physicians, *Paulus Barbette* and *Willem Piso,* but especially *Swammerdam,* who was shortly afterwards to acquire such universal fame. These four months which *Steno* spent in Amsterdam, however, derived their chief importance from the fact that, on April 7, 1660, he made his first anatomical discovery, in that he found the parotid duct, called after him *ductus Stenonianus.* Though this discovery beyond all doubt is due to *Steno, Blaes* neverthe-

less attempted to appropriate it, and *Steno*, who had already spoken of it as his own, thought himself branded as an imposter, and for the sake of his honour felt obliged to vindicate himself. This caused a bitter controversy, which lasted for the next three years. It has been so thoroughly discussed by *Gosch* that there is no reason to go into details about it here. The unequality of the contest will at first sight be apparent to anybody: on one side the highly respected professor with his numerous, influential friends; on the other side the unknown foreign student, twenty-two years of age. And *Blaes* certainly made the most of all his advantages; he backed the controversy with the whole of his authority; he made use of testimonials from his relatives and students; nay, he even induced a professor in Utrecht, *Nicolaas Hoboken*, who had no qualifications whatsoever to act as judge in the matter, to publish a pamphlet against *Steno*, which contained nothing but loose assertions, accusations and insults. To this *Steno* replied in a manner which reflected the greatest honour upon himself. He never swerved from actual facts, but proved in a tranquil and objective manner that he was right and *Blaes* was wrong; and though there is no doubt that he was deeply hurt by *Blaes'* accusations, he never for a moment let himself be carried away to any harsh or offensive remark. The controversy ended at last with a kind of reconciliation: *Steno* at the request of his friends left a final, decisive pamphlet against *Blaes* unpublished, and the latter on his side one day received *Steno* in his house.

It is worth while noticing that *Steno* in reality was not the first observer of the parotid duct, which had, in fact, been found as early as 1655 by *Needham*, who, however, did not publish his discovery till 1667.

While this was going on, *Steno* was no longer in Amsterdam. After a stay which had, as mentioned above, only lasted four months, he left for Leyden, where he carried on his studies under *Sylvius* and *van Horne*. *Franciscus de la Boë Sylvius*, an able physician and clinicist who demonstrated patients to his students, was of great importance in the development of the science of chemistry, especially that of physiological chemistry, as well as in the study of the brain and the glands. His talents, his catching energy, his enthusiasm and his power of expressing himself clearly, as well as his many amiable qualities made a strong impression upon *Steno*, which is evident from the frequent mention he makes of *Sylvius*, even many years afterwards. With *Sylvius* as well as with his other teacher, *van Horne*, a celebrated surgeon and anatomist, *Steno* was at that time most intimately connected. The fact is that all the important discoveries, which *Steno* made during his stay of nearly four years in Leyden, had already secured him many friends and admirers. He was admired as an able dissector, but still more for his capability of making new ob-

Leyden 1660–1664.

servations, though perhaps most of all for his power of drawing sound, far-reaching, often ingenious conclusions from the observations made; while at the same time he was loved for his modesty, his kindness, his upright way of thinking and his candour.

Besides these two teachers of his and *Swammerdam*, who had also gone to Leyden, there were other well-known scholars, who belonged to *Steno's* most intimate circle. Of the latter may be mentioned his former teacher, now his friend, *Ole Borch*, who made a long stay in Leyden, and *Matthias Jacobæus*, a young Dane of the same age as *Steno*, the son of *Jacob Matthiesen*, who after having been professor in Copenhagen had been made Bishop of Aarhus in Jutland. In Leyden *Steno* also made the acquaintance of one more country-man, which acquaintance, though at the time it seemed only temporary, was later on to be renewed under quite different circumstances. This countryman of *Steno's* was *Peter Schumacher*, who was then merely a young student, but who was afterwards to become the famous and unhappy High Chancellor of Denmark, Count *Griffenfeldt*. Among the Dutch scholars with whom *Steno* was most in contact during his stay in Leyden, must be mentioned the highly gifted *Jacob Golius*, who besides being an able mathematician was a great traveller, known for his knowledge of Arabian, Turkish and Persian. He was Professor of Arabian and Mathematics in Leyden, and, no doubt, it was to him that *Steno* essentially owed his knowledge of languages, for instance Arabian, as well as of mathematics, which branch of science attracted *Steno* so much that, for a time, he thought of devoting himself exclusively to the study of mathematics, or more particularly of geometry. Finally we may mention *Steno's* intimate friendship with *Benedict Spinoza*, who during this period was living outside Leyden in Rijnsburg, but the religious views of the two men diverging more and more this friendship was destined to be of no long duration.

The many notable men, who during these years were connected with *Steno* by ties of friendship, were however not the only factors contributing towards his development; of great importance were also those, who acted as his scientific, sometimes even his personal, adversaries. Among these *Blaes* plays the most prominent part, and *Steno* later on looked upon his controversy with *Blaes* as a link in his religious development. Besides him some others must also be mentioned: *Bils*, *Deusing* and *Everaerts*. — *Lodevijk de Bils* was a well-to-do, but not very cultured amateur anatomist, who at that time enjoyed a great reputation, chiefly because he pretended to have found a way of embalming dead bodies so as to keep them for ever in a perfect state of preservation, for which discovery he demanded the sum of 150,000 florins. He also made believe that he had a trick of

his own, by which he was able to perform vivisections without bleeding. *Steno* spent much time — too much time in our opinion — to prove the incorrectness of the assertions of *Bils'* and of the theories set forth by him concerning the flow and function of the chyle and the lymph. — As a follower and defender of *Bils* may be mentioned *Deusing*, a learned professor of Groningen, known for his passion for writing as well as for his quarrelsomeness, who though he himself is said never to have made a single anatomical observation — in fact he was more of a philologist — yet published a treatise in defence of *Bils*, directed against *Steno*. — And lastly *Bils* found another advocate, and *Steno* another adversary, in *Anthony Everaerts (Everardi)*, a pupil of *Deusing* and a physician in Middelburg.

One phase of Dutch mental life, the phase, perhaps, which made the strongest impression upon *Steno* and which became, indeed, of the greatest importance to him later on, was the interest everybody took in religious matters. Contrary to nearly all other countries Holland at that time enjoyed full religious liberty, and its inhabitants belonged to very different creeds and denominations. *Steno*, who was himself a Lutherian, had received his education in a country, where all the inhabitants were of the same faith, and where dissenting opinions were scarcely tolerated. It is unquestionable that these circumstances, which made Holland so different from his native country, together with his constant coming into contact with people of various creeds left their mark upon *Steno's* earnest, religious mind and called forth many new reflections upon religious matters.

Copenhagen 1664.

Family-affairs compelled *Steno* to return to Copenhagen in the spring of 1664. His step-father had recently died, and his mother, who was dangerously ill, died shortly afterwards. Even at this early period *Steno* enjoyed a great reputation in his native town, and one of his principal works, which appeared about this time in Copenhagen and the same year in Amsterdam, was dedicated to *Frederik III*, the King of Denmark, to whom *Steno* at an earlier date had been warmly recommended by *Thomas Bartholin*. There was just then a very good opportunity of connecting *Steno* with the University of Copenhagen, and he himself surely expected to become a professor; but *Bartholin*, who otherwise took a very warm interest in the success and progress of his branch of science, was at the same time of the opinion — in other cases as it seems quite justly — that the best way of promoting it was by making members of his own family occupy the public positions. So the professorship was not given to *Steno*, but to *Bartholin's* nephew, the abowe-mentioned *Matthias Jacobæus*. This injustice was a severe blow to *Steno;* and in the autumn of the same year he left Copenhagen.

By Amsterdam and Cologne, where he had a conversation with a

Paris 1664—1665.

Jesuit concerning Protestantism and Catholicism, which revived his interest in religious matters, *Steno* went to Paris, where his fame as a natural philosopher had gone before him, and where he was received with the greatest kindness and cordiality. *Thévenot,* the distinguished supporter of the various branches of natural science and the founder of the French Academy, very kindly took care of him, helped him to get subjects for his anatomical and physiological researches, introduced him into the best circles of the capital and even invited him to live in his own house. *Steno* met there his friend *Swammerdam,* who also was a guest of *Thévenot's. Steno* and *Swammerdam* were both of them amiable, straightforward and honest young men, equally enthusiastic about the study of natural science, and though *Swammerdam's* interests were more particularly confined to the morphology and biology of the lower animals, his studies being thus to some extent remote from what were the chief objects of *Steno's* researches, yet the two friends collaborated in two or three series of investigations. It was also in Paris, before an audience of interested scholars, who met at the house of *Thévenot,* that *Steno* delivered his famous discourse on the anatomy and physiology of the brain. — But in Paris, no more than in any other place, did he exclusively seek the scientific circles; he associated with many people of different interests, especially with catholic divines and people connected with them. Thus *Steno* is known to have been debating religious problems, among others with *Elisabeth Rantzau (Deo sacrata Rantzovia),* the widow of *Josias Rantzau,* Marshal of France, who herself had taken the veil and founded a nunnery of the order of the Annunciata.

Florence 1665—1668.

After having visited serveral towns in France, about which voyage little or nothing is known, *Steno* left for Italy, arriving in Florence in the summer of 1665. The letters of introduction, which he brought from *Thévenot,* his fame and prepossessing appearance made all doors open to him, and he soon felt quite at home in this city, which, as the years went on, he learned to love more and more. The Grand-Duke of Tuscany, *Ferdinand II,* in various ways attached *Steno* to his court, partly by securing him a good income that he might live without cares, partly by procuring him materials for investigation and the opportunity of carrying out his researches.

These first years in Florence were the happiest years of *Steno's* life. He was honoured and liked, he felt that he was among friends, and he loved the city and country in which he was living. He eagerly took part in the social life of the town, felt happy and free of cares, and his most important scientific works appeared during this period.

It would take too long to give a detailed account of all the eminent men, with whom *Steno* became acquainted, and to whom he attached himself during these years. We will only briefly, and with

no definite plan, dwell upon those, who in one way or another were of importance to the development of *Steno* during this period. There was *Vincenzio Viviani*, the pupil and biographer of *Galilei* and closely connected with the Grand-Duke's court, who besides being a theoretical mathematician of note spent his time, not only in scientific experiments, but also in works of practical purpose, the building of forts, the regulation of rivers &c. He was an uncommonly gifted scholar, lively and enthusiastic, jealous and inconstant, but his friendship for *Steno* was sincere and unbroken. There was also *Carlo Dati*, who studied natural science and literature and was universally praised for his kindness to all who came into contact with him. Further there was *Francesco Redi*, who later became Physician in Ordinary to the Grand-Duke; he distinguished himself as a poet as well as by his studies of natural science and languages, and was, by nature, a kind and modest man, loved by all.

Of the Florentines, who in those days enjoyed a great reputation, the one who came in closest contact with *Steno* was, perhaps, Count *Lorenzo Magalotti*. The last scion of an ancient noble Roman family and educated by the Jesuits at Rome he was a young man of incredible natural gifts combined with a vivid interest in all branches of science, his knowledge ranging from astronomy to anatomy, from theology to mathematics and even embracing numerous languages, European as well as Oriental. He had an exceeding charm of manner, was ambitious, a zealous Catholic and passionately attached to *Steno*. For a while he was the Secretary of the *Accademia del Cimento*, later on he was appointed the Ambassador of *Cosimo III* in Vienna. Among other scholars, whom *Steno* met and made friends with during these years, was *Marcello Malpighi*, the excellent anatomist, who, it is true, never resided in Florence itself, but with whom *Steno* nevertheless for a long time kept up a constant intercourse, which was all the more natural as the researches made by these two natural philosophers often touched one another.

During these years, spent at the court of the Grand-Duke, *Steno* not only lived in Florence; he also accompanied his patron on his tours to various parts of Tuscany, which tours, among other things, gave *Steno* the opportunity of making those researches concerning the geology of the country, which more than anything else have contributed to his fame. But while engaged in these examinations and associating with friends, like himself interested in natural science, he was constantly brooding over the problem, which more and more took hold of him: the question of Protestantism *versus* Catholicism. It would carry us too far, if we here were to examine closely this side of *Steno's* development. We have already hinted at his natural readiness to take up this question, and how his stay in Holland and

Paris gave him ample opportunities for discussing religious problems. In Florence the same questions were, for many reasons, brought still nearer to him. Besides his above-mentioned friends, whose endeavours to win him over to Catholicism were perhaps only indirect, he had other friends of either sex, whose chief aim was to bring about his conversion. Among the latter, especially deserving to be mentioned, are *Maria Flavia*, an elderly nun of an ancient, distinguished Florentine family, and *Lavinia Felice Cenami Arnolfini*, married to *Silvestro Arnolfini*, the Ambassador of Lucca in Florence. To the latter, who is described as a refined, intelligent and zealous lady, together with Pater *Emilio Savignani* the conversion of *Steno* was chiefly due; and in December 1667 he definitely renounced the protestant religion. *Steno* was surely perfectly honest and sincere in his change of faith, and also some of those, who worked for his conversion have, no doubt, acted solely in view of the salvation of his soul; but to many the most important feature of the case was the triumph it would mean to the Catholic Church, if it were to win over a man of *Steno's* reputation, and they naturally felt confident that he would wish and also be able to apply his great gifts in the service of the Church of Rome.

On the very day when he renounced his protestant faith *Steno* received a letter, in which the Danish King summoned him home, holding forth at the same time the promise of a post at the University of Copenhagen.

Steno, however, did not set off at once; there was much to retain him in Italy; moreover he had to inform the Danish government of his change of faith in order to obtain liberty of worship. While waiting for the settling of this matter he composed a brief *Prodromus* on the contents of the great work, which he intended to write, and which was to be based upon the above-mentioned observations of the geological conditions of Tuscany. This brief, preliminary record is, no doubt, *Steno's* most ingenious work, abounding as it is with acute observations and with still more acute conclusions and generalizations. It was finished in 1668 and published in 1669, but the great work, the forerunner of which it was intended to be, never appeared, perhaps because *Steno* felt too divided in mind. During the first years after his conversion his interests in religious and scientific matters are evidently at war, and though he makes some minor researches and writes a series of small papers, these works, which are able enough in themselves, are yet almost entirely lacking that ingenuity, in which most of his earlier works abound.

Rome and Naples 1668. Murano, Innsbruck,

It was thus not until a year after *Steno* had been called back to Copenhagen that he left Florence, and then only for Rome and Naples, from where he set out northwards. In the spring of 1669 we find *Steno*, first in Murano, then in Innsbruck; late in the summer he

was in Vienna, afterwards in Prague, and in the spring of 1670 in Amsterdam, where he remained till early in June. But *Steno* did not feel at home there, as he had done before; his change of faith had estranged him from his former friends and at the same time involved him in various conflicts with the Protestants. *Frederik III,* who had summoned *Steno* back to Denmark, had died in February in the same year, and this together with an invitation to go back to Florence, because *Ferdinand II* was dangerously ill, made *Steno* give up his intended voyage to Denmark and return to Florence instead. *Ferdinand II,* however, had died before *Steno's* return, but *Cosimo III,* a great patron of all branches of science and moreover a deeply religious man, received him, if possible, in a still more friendly way than his father had done, encouraged him to carry out his intended geological work, and provided him with employment by making him arrange the large collection of minerals in the Pitti Palace. This time *Steno* stayed in Florence for two years, though, as before, he travelled about a good deal, examining, for instance, in the summer of 1671 two grottos in the Alps at Gresta and Moncodine, but with the exception of two short Letters to the Grand-Duke about his discoveries in these grottos no scientific works exist from the hands of *Steno* during these years.

Prague 1669. Amsterdam 1670.

Florence 1670—1672.

Early in 1672 *Steno* received a second summons home, worded in the same terms as the one he had received four years and a half ago. *Steno* obeyed the order and left for Copenhagen, where he arrived in the course of the summer. The time of his return seemed in every respect a favourable one. Anatomy had of late years been neglected at the University of Copenhagen, and it fell to *Steno* to re-open the *Theatrum Anatomicum* and make many anatomical demonstrations, private and public, which here too aroused the liveliest admiration in those interested in natural science. Besides, *Thomas Bartholin* just then commenced the publication of his famous periodical, the *Acta Medica Et Philosophica Hafniensia,* in which *Steno* had a good opportunity of publishing his observations. But in one more respect the time of *Steno's* return seemed a favourable one, as a more tolerant attitude towards the Catholics was beginning to make itself felt, especially through the influence of *Griffenfeldt.* This change of attitude was, however, as yet not very strong in its results. Thus *Steno* could not become a professor at the University, for which reason he received the title of *Anatomicus Regius,* and though left in peace by most people he was attacked in a rough and reckless manner by some of his compatriots, so that his stay in his native town was anything but pleasant to him. At this period *Steno's* mind was more than ever divided between religion and science, and his publications consisted partly of replies to attacks directed against him from the Protestants,

Copenhagen 1672—1674.

partly of descriptions of some of those animals, which he had dissected, and, last not least, of the splendid address, which he delivered at the re-opening of the anatomical theatre. But he never published any descriptions of the majority of his dissections. Some of them were, it is true, described by others in the *Acta Hafniensia,* but many are only known through brief notes written down by *Holger Jacobæus,* the brother of *Steno's* above-mentioned friend, *Matthias Jacobæus,* at that time *Steno's* dearest pupil and later Professor at the University of Copenhagen.

After this time no scientific work whatsoever appeared from the hands of *Steno.*

At length the stay in Copenhagen became too painful to *Steno;* he sent in his resignation, and after it had been accepted, he immediately left the country. By way of Hanover, where he paid a visit to the Duke, *Johann Friedrich,* likewise a convert to Catholicism, he went to Amsterdam, and from there to Florence, where he arrived about Christmas, 1674, and where he became the tutor of the son of *Cosimo III.* He probably altogether abandoned the study of natural science, being now entirely absorbed in his own relation to religious problems, and occupying himself with the writing of theological tracts and polemical pamphlets, among which his well-known letter to *Spinoza,* to which the latter never replied. It may be said of this letter of *Steno's,* as well as of all his religious writings, that they have the same spontaneity, the same subjectivity and the same general impression of being founded upon a direct observation of the phenomena, which we observed in his writings on natural science. But while these qualities made the strength of *Steno* the scientist, and to some extent also of *Steno* the Catholic, they prevented *Steno* from ever becoming, what some of his friends had hoped he would become, an eminent theologian. In the autumn of 1675 *Steno* finally took Holy Orders, and henceforward he devoted his life exclusively to the cause of the Roman Church, and met with an ever-increasing admiration in Florence, the sincerity of his pious life being looked upon with general veneration. He often tried to convert foreign Protestants, who visited the city, in many cases not without success. But *Steno* went further in his demands upon himself, and more especially he blamed himself because, during the first years after his conversion, he had been devoting part of his time to other things besides the service of God and the Catholic Church.

Florence 1674–1677.

Two years after his return to Florence *Steno* was appointed Bishop of Titiopolis *in partibus infidelium* and Vicar Apostolic of Northern Germany and Scandinavia. He went to live in Hanover, the residence of the above-mentioned Duke *Johann Friedrich,* where he worked zealously for the cause of Catholicism, bringing about many conver-

Hanover 1677–1680.

sions. He lived a very frugal life, spending all he could spare to help the poor, and sacrificing his time and his strength in the cause of religion. In the early winter of 1679 *Johann Friedrich* died, being succeeded by his Protestantic brother, *Ernst August*. It now became impossible for *Steno* to remain any longer in Hanover, and in the spring of 1680 he settled in Munster as the Suffragan Bishop of the Bishop of Munster, *Ferdinand*, Baron *von Fürstenberg*. His income was not so large as it had been in Hanover, so he sold all his property and lived still more frugally in order to be able to help the poor, especially those lately converted to Catholicism. He performed numerous divine services, made troublesome journeys round the neighbourhood and fasted strictly. By his pious life he also here succeeded in impressing many people; the admiration for him increased, but with it the envy, and by his extreme zeal he made numerous enemies. *Munster 1680–1683.*

When *Steno* had lived for three years in Munster, the Bishop died; so he left and went to Hamburgh, which likewise belonged to his vicariate. He lived there for two years, in the utmost poverty. He kept no servants, he fasted most of the days of the week and wore ragged and filthy clothes. He did nothing to live up to his rank, did not even wear his clerical suit and spent everything on the poor, working so ardently for the benefit of Catholicism that he made himself hated even by the Catholics, who threatened to cut off his ears and drive him from the town as a criminal. *Hamburgh 1683–1685.*

To further minister the cause of his Church *Steno* left Hamburgh for Schwerin, where he worked under circumstances, which were, if possible, still more distressing, and here he died in unspeakable misery, forty-eight years old. The Grand-Duke of Tuscany had his body conveyed to Florence, where it was deposited in the crypt of St. Lorenzo. *Schwerin 1685–1686.*

II

As for the material, which *Steno* used as the basis of his researches, he was nearly always indebted to circumstances; he very seldom appears to have chosen it of his own accord. Thus, in his early days in Holland he was reduced to dissect such animals, or parts of animals, which he could get in the cheapest and easiest way. Later on in Florence *Steno* generally made his examinations on animals, which the Grand-Duke thought curious and therefore sent to him; or he made his geological researches in parts, to where he came in the train of the Grand-Duke. Also during the two years, which *Steno* spent in Copenhagen as *Anatomicus Regius*, he again had to use the material, which chance offered to him. Partly because his material was gene-

rally not of his own choosing and therefore in itself limited, partly because he was so frequently interrupted by external circumstances, *Steno* hardly ever pursued the problem, which had raised his interest, until he came so near solving it, as was at all possible; on the contrary he broke off his investigation of a problem, in some cases even several times, to return to it, when he had the opportunity of doing so. This accounts for the fact that so few of his publications are complete in themselves; they nearly always appeared as the continuations of previous works or as the beginnings of works to come. For that reason the contents of his writings will be analyzed in the following pages, not in the succession in which he published them, but according as the several parts of his publications are connected with one another by the nature of the questions he attempted to solve. It is a matter of course that *Steno* made many examinations and solved many problems, which are either of minor interest or were not directly connected with the questions, to which he more especially devoted himself. These latter can be divided into different groups, the most important of which are: The Glands, the Lymphatic System, the Heart, the Muscles, the Development of the Embryo, the Sexual Organs, the Fishes, and in the case of all these groups both the anatomical and physiological sides of the questions. There are, moreover, subjects which — only apparently, however — are remote from these: the Occurrence and Development of Fossils and Crystals, and the Origin of the Strata of the Earth.

Before going into a detailed account of what were *Steno's* contributions to the various groups in question, we will in a few words draw attention to some phases of his personality as a man of science, phases in which he differed from most of the scientist of his time. Not only in his ingenuity, which was greater, fresher and more spontaneous than that of the majority, did he surpass most of his contemporaries in the scientific world and, without exaggeration, inscribe his name among those of the greatest men of his day; not only on the strength of his unusual powers did he distinguish himself; it was perhaps above all through his scientific method. He asked his questions and gave his answers as a scientist of the twentieth century; and deeply religious though he was, he never for a moment introduced any supernatural element in his solutions of problems of natural science.[1] And while the majority of his contemporaries were, before all, scholars, and,

[1]) From about the time when *Steno* took Holy Orders his development retrograded, even as far as his way of looking at nature was concerned. In his chief geological work *(De Solido Intra Solidum* &c.) when touching upon the questions of rock-crystals, gems, precious and base metals, he had exclusively dealt with their formation and occurrence, but when he later on mentioned these very things in a sermon, he merely considered them from a religious point of view, dwelling on how their symbolic meaning was to be looked upon by markind. See *Stenonis Nicolai Opera Medic. Palat. 36. Sermo XL* in R. Biblioteca Laurenziana in Florence.

because they relied so implicitly upon researches made by those who had gone before them, perhaps did not always make such observations as were before their very eyes, *Steno,* together with the best of his age, *Harvey, Sylvius, Borelli, Malpighi* and *Swammerdam,* was first and foremost an observer and an experimentalist. He observed the phenomena in a calm, unprejudiced and natural manner and thus discovered what, because of their preconceived ideas, most of his contemporaries had failed to see. The number of new and important discoveries, which are due to *Steno,* is exceedingly great, and yet we do not here find the full expression either of his talent or of his significance. His genius reveals itself in the conclusions, which he draws from his discoveries, and in the generalizations which he makes. His conclusions are not only astonishing by their number, but still more by their soundness and clearness, and yet perhaps most of all admirable by their correctness and their scope, being such that in some cases they have not been fully appreciated until now, some two hundred and fifty years after their first appearance. Still there is one fact, which may perhaps help to throw further light on *Steno's* scientific personality. At a time when most natural philosophers were, before all, physicians who looked upon natural science as the auxiliary of medicine, *Steno* himself never practised as a physician, and in his researches very rarely touched upon questions of a purely medical character.

The Glands and the Lymphatic System.

As mentioned above, *Steno* made his first discovery in Amsterdam on April 7, 1660, when, being engaged in dissecting the head of a sheep, he found the parotid duct. He called *Blaes,* who declared not to know this duct and referred him to *Wharton's* work on the glands, published in 1656. As *Steno* neither here nor anywhere else found any positive information concerning this question, he continued his investigations, and when shortly afterwards he went to Leyden, he showed his discovery to *Sylvius* and *van Horne,* of whom the former was the first to find the parotid duct in man, the latter the first to demonstrate it in public, naming it after *Steno.*

Through this first discovery of his *Steno* was led to study the anatomy and physiology of the glands and the lymphatic system. With regard to the glands *Steno* found in the first place that, what had hitherto been called the parotis, had really to be distinguished as two separate glands, of which the one secreted saliva through the duct found by him, and the other, an ordinary lymphatic gland, belonged to the lymphatic system. The former of these *Steno* classed among *Sylvius' glandulæ conglomeratæ,* the latter among his *glandulæ conglobatæ.* Furthermore he found that lymphatics were running from *parotis conglomerata* to *parotis conglobata,* and that another lymphatic vessel ran to a gland lying further below, his *glandula communis,* which received vessels also from a conglobate gland close to the sub-

maxillary gland, and from one of the same kind near the tonsils. Leading from this *glandula communis* was a fourth vessel, which together with the other lymphatic vessels of the head opened into the vena cava at the place, where the jugular and axillary veins joined. This discovery was particularly interesting, because it showed that the lymph was conveyed from and not to the salivary glands, which was entirely at variance with the theory maintained by *Bils* and other of *Steno's* contemporaries, *viz.* that all the watery secretions and humors came from the thoracic duct. By this discovery *Steno* was involved in a controversy, not with *Bils* himself, but with *Deusing*, according to whom there were also other ways, in which the saliva could be secreted, *e. g.*, during excessive salivation, by the direct flowing down of the watery fluid of the brain into the cavity of the mouth through the apertures in the sphenoid bone. In his Dissertation *Steno* on the contrary maintained that the arterial blood must be supposed to be of such a composition, as to be able to provide materials for the saliva, which, through the influence of the nerves, is secreted by the glands, by means of a process, which might be conceived as a temporary constriction of the minute blood-vessels, in which manner a mechanical hindrance was made for the passage of the blood, which would then give off its more watery elements. — Against *Everaerts* who, as related above, likewise agreed with *Bils* in his view of the function of the lymph, being of the opinion that the lymph was conveyed direct to the mammæ, to be there secreted as milk, *Steno* strongly asserted that the mammæ were glands, and that they secreted milk in a manner analogous to that in which the salivary glands secreted the saliva.

Steno's next researches concerning glands turned upon the lachrymal glands. Even *Wharton* thought that the tears originated in the brain, from where they passed through the nerves, and that their flowing was due to a contraction of the brain, which occasioned the tears to be squeezed out, the tears subsequently passing through the nerves and through minute apertures in the eye, while the normal function of the lachrymal glands was to receive this humor from the nerves. *Steno* discovered the minute ducts of the lachrymal glands and immediately gave the one correct explanation of the secretion of the tears, when he maintained that the tears were the produce of the lachrymal glands and had their origin from the arterial blood through the influence of the nerves on the glands; that the normal function of the lachrymal fluid was to keep the surface of the eye and eyelids smooth, and that this fluid afterwards passed through the puncta lacrymalia, the lacrymal canals, which have also first been observed by *Steno*, and through the naso-lachrymal ducts to the nose, which passage was only insufficient, when the lachrymal fluid was secreted in excessive abundance, *e. g.* during the process of weeping. Finally it is worth

mentioning, that *Steno* in the same Treatise also asserted the cerumen to be a glandulous secretion, the glands in question lying between the skin and the cartilage.

From the observation that the membranes of living animals are always humid, *Steno* was led to the theory that these membranes owe their humidity to glands; and setting to work to find glands in the nose, he discovered them in great abundance below the mucuous membrane. But besides this infinite number of small glands he discovered in the sheep and in the dog a large, separate conglomerate nasal gland, and furthermore remembering how channels had been provided for carrying away the fluid of the eye, *Steno* looked for a passage into the mouth, and found that the *canales naso-palatini*, sometimes called *canales Stenoniani*, might serve this end in about the same manner as the anterior and posterior apertures of the cavity of the nose. As to the sweat *Steno* stated that it too was a glandular secretion.

After a short interval, during which he occupied himself with other problems, *Steno* once more returned to the glands. He pointed out, how all the conglobate glands belong to the lymphatic system, looking upon the latter as consisting of conglobate glands and lymphatic vessels; but, erroneously, he also made those of the conglomerate glands, which secrete a watery fluid, together with their ducts, belong to this same system.

As the essential results of his investigations up to this date *Steno* had established the following facts: 1) that all lymphatic vessels are connected with glands, the place of formation of the lymph being unknown; 2) that some of the lymphatics belonging to the conglomerate glands, *i. e.* the excretory ducts of these glands, carry their secretion to the cavities of the body: the eyes, the ears, the nose, the mouth, the gullet, the throat & c.; 3) that the lymphatic vessels belonging to the conglobate glands, those now called the lymphatics, all carry their contents back to the venous system, either direct or through other conglobate glands; and 4) that all glands are organs to which and from which lymphatic vessels are running. On the strength of his researches, and in continuation of what has already been mentioned, *Steno* further stated that not only do all conglomerate glands evacuate their fluids into the cavities of the body, but that wherever in the natural state a fluid is found on a surface, it has its origin from such glands. To those fluids he referred the following: 1) the fluid in the pericardium; 2) the sweat; 3) the fluid in the cavities of the brain; 4) the fluid on the surface of the organs of the thoracic and the abdominal cavities; and 5) the fluid by which the fetus is nourished, and which he supposed to be secreted in the placenta from the maternal blood, chiefly because he had succeeded in separating, without bleeding, the fetus from the wall of the uterus of a cat. It was the

villi of the placenta and of the wall of the uterus, which he considered to be what he termed the *eminentiæ glandulosæ*. *Steno* himself enumerates his discoveries as follows: 1. *Vas salivare exterius sive parotidum vas.* 2. *Vasa buccarum.* 3. *Vasa sublingvalia minora.* 4. *Vasa palati.* 5. *Meatus anterior e naribus in palatum.* 6. *Vasa epiglottidis.* 7. *Vas narium.* 8. *Vas narium ovibus peculiare.* 9. *Viæ a palpebris in nares.* 10. *Vasa palpebrarum seu lacrymalia.* 11. *Vasa rajæ superficiem exteriorem lubricantia.* As regards two important, larger glands *Steno* has thus for the first time acknowledged them to be glands; he has discovered several excretory ducts and furthermore shown the existence of canals along which the various secretions are conveyed to the great cavities of the organism; he has demonstrated that the secretion depends upon the supply of blood and upon the nervous system; and further, in the case of a number of small glands, he has shown the existence of these glands and explained their significance, pointing out how the fluid, which covers animal membranes, has not simply passed through these membranes, but has been secreted by numerous small glands of their own.

In addition to the above-mentioned glands *Steno* in a fish, the ray, found the glands of the skin, which give to these animals their lubricity. In the same specimen he also found the minute glands of the stomach and the intestine. It is also of interest to note — as appears from a MS. of the above-mentioned *Holger Jacobæus* — that at a dissection in 1673 *Steno* demonstrated those glands in the small intestine, which *Peyer* found in the same year, although he did not publish his discovery until four years later.

The Heart and the Muscles.

By observing that the portion of the vena cava, which is nearest the heart, possessed independent contraction, which contraction, in animals laid open by vivisection, continued long after the pulsation of the heart had ceased, *Steno* was led to a close investigation of the heart and its function.

Even after *Harvey's* discovery of the circulation of the blood, the views concerning the importance of the heart to the organism were very much at variance, and numerous explanations of its function had, in reality, only this one thing in common that they were alike fanciful and alike far from being consistent with the actual facts. *Steno* was among the first, who reduced the existing chaos to clearness and order. In a Letter, dated Leyden ult. April. 1663, which he wrote to *Thomas Bartholin*, he told in few and simple words, that in his opinion the heart was a muscle and nothing but a muscle, and he expressed the hope that he would soon be able to prove this statement: *Qvod substantiam cordis spectat: evidenter, ut opinor, demonstratum dabo, nihil in corde reperiri, qvod non reperiatur in musculo, nec in corde desiderari, qvod in musculo invenitur, si illa respexeris, qvæ ad musculi faciunt*

essentiam, id qvod & de auriculis patebit verum, &c. *Bartholin* was far from admitting the correctness of *Steno's* view. *Hippocrates* himself, it is true, had already called the heart a muscle; but at *Steno's* time this view was completely overshadowed by that of *Galen*, and *Steno* was quite aware that his assertion would be received with the strongest opposition. He was likewise aware that it was not sufficient to make an assertion, but that a proof of its correctness might justly be claimed, and so he went the way of investigating the anatomy and physiology of the ordinary muscles, afterwards comparing the results of his researches with those attained by an examination of the anatomy and physiology of the heart. As early as in the year after he had written his Letter to *Bartholin*, *Steno* published his first Treatise on the muscles. He begins his Treatise by mentioning the anatomy and physiology of some particular muscles, first of all the respiratory ones; he corrects some errors in the current view of the latter, explains various phenomena, and gives their name to the levatores costarum muscles. Then he shows that the tongue does not, as was generally supposed, consist of a substance of its own, neither is it a gland, as *Wharton* among others maintained, but it is altogether made of muscular fibres, the course of which he describes. He also describes the two spirals of the muscular fibres, which cross in the œsophagus of the mammals. Proceeding to speak of the general anatomy and physiology of the muscles, *Steno* furthermore says that the muscles do not, as was then generally supposed, consist of a parenchyma, *caro*, and muscular fibres, but are entirely made of fibres, to which must only be added arteries, veins, nerves and thin layers of fibrous tissue. The fibres, *fibræ motrices*, he again divides into fibrils, *fibrillæ minutissimæ*, and every muscular fibre, according to his opinion, is continued at either end of the muscle in a tendinous fibre, so that every one of the tendons belonging to a muscle has a number of tendinous fibres corresponding with the number of muscular fibres in the muscle. But when examining the heart *Steno* here also found nothing but muscular fibres (terminating in tendinous fibres), vessels, nerves and some connective tissue; and having found that also in the heart the function of these fibres was contraction, he concluded that the heart itself was a muscle and nothing but a muscle. Moreover *Steno* very carefully examined the course of the fibres in the heart, found the bending of the fibres at the apex and the different degree of obliquity of the different layers of fibres, which results were shortly afterwards carried further by *Borelli*. Finally *Steno* maintained that the fact of the contraction of the heart not being voluntary cannot be used as an argument against the heart's being a muscle, because many muscles, universally recognized as such, contract involuntarily. In thus showing what the heart is, *Steno* at the same time showed what it is not. He says himself: *Non erit cor amplius sui*

generis substantia, adeoqve nec certæ substantiæ, ut ignis, calidi innati, animæ sedes, nec certi humoris, ut sangvinis, generator, nec spirituum qvorundam, vitalium puta, productor.

Steno's interest in the general anatomy and physiology of the muscles visibly showed itself in a more extensive work on this subject, which work he himself seems to have valued highly, but which is, perhaps, now considered the weakest of his writings. The underlying idea, however, is in itself highly praiseworthy. His point of view was that all previous explanations as to the way in which the contraction of the muscles took place were very improbable and, which was still worse, very vague and obscure, and so he made it his aim to introduce the exact mathematical method into the investigation and explanation of the contraction of the muscles. *Steno* took a great interest in mathematics, in which branch of science he possessed considerable knowledge, and he was of the opinion that mathematics might be applied in physiology and become of as great importance there, as it already was in other branches of science, *e. g.* astronomy. About the same time the same idea had led *Borelli* to occupy himself with bringing mathematics to bear upon the more mechanical side of the function of the muscles. *Steno* wanted to utilize the mathematical laws to explain how the very contraction of the muscle took place. He justly looked upon the muscular fibre as the elementary part, the function of which, during the contraction, it was particularly important to become acquainted with. When in spite of much diligence and the most careful proofs he still did not arrive at a correct result, this was due to the following two errors. Firstly his starting-point was a wrong conception of the course of the muscular fibres. As has been already mentioned he thought that every muscular fibre at either end passed into a tendinous fibre, and he furthermore was of opinion that the course of the muscular, as well as that of the tendinous fibre were each of them rectilinear, forming an angle at the two places, where the muscular fibre became a tendinous one, neither of which suppositions have proved to agree with the actual facts. Secondly, he did not pay attention to the fact that every separate muscular fibre, when shortened by contraction, must needs become thicker, and that this in its turn must act on the whole figure of the muscle during the contraction.

Steno's interest in the special anatomy of the muscles displayed itself some years afterwards in his thorough description of the muscles of an eagle, which he dissected during his stay in Copenhagen in 1673.

Further we must mention the experiment, which still bears *Steno's* name, and which consisted in his ligaturing the descending aorta of a living animal, the consequence of which was a paralysis of the hind-legs, which paralysis ceased when the ligature was removed.

Finally *Steno* was the first to show that contraction of a muscle might occur not only by stimulation of its nerve, but also by stimulation of the muscle itself.

The Brain.

At an early period *Steno* became interested in the study of the brain. This is evident from a Letter to *Thomas Bartholin*, dated March 1663, in which he speaks about his having made numerous dissections of this organ, adding that what he found through these dissections was in every respect inconsistent with what *Descartes* taught about the brain. It is quite natural that *Steno* should become interested in the study of this organ. He was a pupil and friend of *Sylvius*, with whom he was almost in daily intercourse, and *Descartes' De Homine*, which had just appeared, had made an enormous sensation. It is easy to understand that *Steno*, when first mentioning *Descartes*, takes up a critical position towards this work, and more especially towards that part of it which deals with the brain. *Steno* clearly saw that nearly all the anatomical descriptions and physiological explanations of *Descartes'* were quite erroneous, and he was certainly at too close a range to be able to fully understand the idea of this particular work.

The interest *Steno* took in the brain and its function might rationally lead one to suppose that he published his numerous observations on this organ. Strictly speaking this never happened, though during his stay in Paris he delivered a Discourse on the Brain before the assembly of learned men, who met at *Thévenot's*. This Discourse, which scarcely contains a single new observation, he left in Paris when leaving that city, and it was not published till four years after by a Paris bookseller. *Steno* seems purposely to leave the results of his own researches out of the question, and when this little work still ranks among his most important ones, it is because it contains instructions concerning the study of the brain in particular, and the study of natural science in general, so intelligent and so sound that an anatomist like *Winsløv* — who by the way was a relative and countryman of *Steno's* and like him a convertite to Catholicism — many years afterwards admits, *que le seul Discours de feu M.* Stenon *sur l'Anatomie du Cerveau, a été la source primitive & le modele general de toute ma conduite dans les travaux Anatomiques*, and even goes so far as to reprint the whole of the Discourse in all editions of his famous Anatomy. Much of *Steno's* Discourse was, in fact, of so far-sighted a nature that it was not till many years after *Winsløv's* time, partly not till our own age, that scientists were able to follow the instructions given by *Steno*. It would carry us too far to give any detailed account of the Treatise; but in order to duly appreciate it, it will be necessary to remind the reader of the views current in the days of *Steno* concerning the brain and its function. The anatomical observations of the brain were still rather rudimentary, and its physiology was greatly based on

sheer fancy. Any intimate knowledge of the more minute structure of the brain was, of course, quite out of the question; it was hardly known that the substance of the brain at some places was made up of fibres, and there was an absolute ignorance of its being so everywhere. As to the different theories concerning its function, they were, really, only at variance as to the distribution of the mental faculties in the ventricles of the brain, and as to the part played by the animal spirits. *Descartes* and *Willis* were — each in his own way, and only partly — exceptions to this. That *Steno* did not estimate *Descartes* very highly as an anatomist has already been mentioned, nor was he greatly attracted by *Willis*. A sane observer like *Steno* could not help noticing that, although much in *Willis* was founded on correct observations, much, on the other hand, rested on pretty similes and analogisms, which were to be taken as proofs. Characteristic of *Steno's* view of the physiology of the brain are the following words, with which his Discourse opens: *Au lieu de vous promettre de contenter vostre curiosité, touchant l'Anatomie du Cerveau; ie vous fais icy une confession sincere & publique, que ie n'y connois rien.* He then proceeds to demonstrate that all those self-relying men, who wrote on the brain, knew as little about the matter as he, or rather less, and that all the ideas, which they reckoned with, were only phantoms of their own imagination. Even the very animal spirits, the existence of which at that time was generally acknowledged, he mentions in the following way: *On voit encore moins de certitude, sur le sujet des esprits animaux. Est-ce le sang? seroit-ce vne substance particuliere separée du chyle dans les glandes du mesentere? les serositez n'en seroient-elles points les sources? Il y en a qui les comparent à l'esprit de vin, & l'on peut douter si ce ne seroit point la matiere mesme de la lumiere. Steno,* however, is not content with pulling down the old building, he also gives advice, and very good advice indeed, as to the way in which a new building is to be erected. He speaks of the best ways of dissecting the brain; he describes, how the skull is to be opened, the best means of acquiring trustworthy figures of the brain &c. &c. Of far greater importance, however, is his assertion that first of all an effort must be made to determine the course of the fibres in the brain, with which its function to all probability is closely connected. Moreover he says that valuable information might be obtained by comparing the brains of animals, from the lower to the higher, as well as by comparing different stages of the development of the brain in the same animal, from the fetus to the adult individual. Furthermore he refers to all the information to be had from the pathological anatomy of the brain; and finally he recommends experiments on living animals, the brain of which were to be examined, while drugs or poisons were either administered in the ordinary way, or applied direct to the brain.

Only twice more in his subsequent writings *Steno* touched upon the question of the brain. In his description of the dissection of a shark he particularly emphasized the exceeding smallness of the brain, expressing the supposition that many nervous fibres leading to the muscles had their origin, not in the brain, but in the spinal cord. This he maintained, partly because the sum of the transverse sections of all nerves leading to the muscles was far larger than the transverse section of the spinal cord at the bottom of the fourth ventricle, and partly because the cervical and the lumbar enlargements were to be found in vertebrates with four extremities, while no such formations were to be found in vertebrates without extremities. In the same Treatise *Steno* also touched upon other interesting questions concerning the brain; but it would take too long to dwell upon them here.

In his last work upon the brain, treating of a hydrocephalic calf, which he dissected in Innsbruck in 1669, *Steno* mentioned a number of observations on the structure of the brain; he also discussed the origin of the large quantity of fluid, and stated that he was of the opinion that the four ventricles were, in reality, only one single cavity. Finally he called attention to the fact that, though in this case the brain was exceedingly disfigured, both sensation and motion were normal.

The Reproductive Organs and the Nutrition of the Fetus.

In the description of his dissection of a ray *Steno* explicitly dwelt on the peculiar egg-shells of this animal, which were in those days generally looked upon as being the uterus of the animal. *Steno* pointed out how this interpretation was in any case quite untenable; on the whole he was not sure that these formations were really produced by rays; but if they owed their origin to these animals, they could not be their uterus, but must be part of their eggs.

At *Steno's* time natural philosophers were very uncertain as to how the fetus was nourished in the uterus and in the egg. Some thought that it received its food through the mouth, others that it received it through the blood-vessels of the umbilical cord. *Steno's* explanation of this process in placental animals was, as mentioned above, that the fetus was nourished through the placenta by a secretion of the villi, which he looked upon as glands. But once, when dissecting a newly-hatched chicken, he found the vitelline duct and became aware of its conveying the substance of the yolk direct into the intestine. As he had no idea of the existence of such a formation, still less of its function, his surprise was nearly overwhelming. He published this important discovery as his own; but it appears from a passage in a later Treatise that he was reproached with having done this, because, as his detractors maintained, the discovery had already been made by others. Concerning the curious circumstances of this discovery, further particulars will be found in the notes (vol. I p. 263 of the present Edition).

In the description of his dissection of a shark *Steno,* after having

mentioned the reproductive organs, set forth as his opinion, that the organs of the female mammals, in his days invariable named *testes*, were not to be regarded as organs corresponding to the testes of the male mammals; that they were, in fact, the same organs as the ovaries of the oviparous animals; that they produced eggs and consequently ought to be called ovaries. This was quite a new aspect of these organs. *Steno* does not go into details about this discovery, but he adds that he hopes to be able to take up the matter for further treatment at a later period. His thoughts, however, became occupied with many other matters, and he never wrote the intended large work. The fact of his having collected materials for it appears from two small Treatises in *Acta Hafniensia*. The investigations, upon which these Treatises are based, were, no doubt, made in close connection with the work just mentioned, but they were not published till 1675, in which interval — in 1672, five years after *Steno's* first communication — *de Graaf* had published his famous observations, and so he, quite justly, obtained the credit of the discovery of the true nature of the mammalian ovaries. As *Gosch* points out, it is well worth mentioning that *de Graaf's* view was so long in being universally accepted, because it was observed that those formations in the ovaries, which were supposed to be eggs, did not loosen nor were carried away as such, which difficulty would probably have been of less importance, in case it had fallen to *Steno's* lot to promulgate the discovery, for already in his first brief communication he expressed himself as follows: *Non amplius dubito, qvin mulierum testes ovario analogi sint, qvocunqve demum modo ex testibus in uterum sive ipsa ova, sive ovis contenta materia transmittatur* &c.

The two Treatises of *Steno's*, which have just been mentioned, contain much of considerable interest. Suffice it here to call attention to the series of observations on the development of the plagiostomes, which is found in the second Treatise. Already *Aristotle* relates, how in the shark *Galeus lævis* the egg is not only fully developed in the uterus, so that the fish becomes viviparous, but is also fastened to the uterus in a similar way as in the mammals, so that the fetus has both an umbilical cord and a placenta. As far as is known, no one had made this observation between *Aristotle* and *Steno*, who, however, in his communication says nothing of his being acquainted with this passage in *Aristotle*. After having given a more detailed description of other anatomical features of this shark *(Galeus lævis) Steno* proceeded to mention another shark *(Acanthias vulgaris)*, also viviparous, also in possession of a yolk-sac and vitelline duct, but without a placenta. — Subsequent investigators found no shark with a placenta, until *Johannes Müller* succeeded in finding once more what *Aristotle* and *Steno* had observed. This scientist pointed out that the reason, why others had not

been able to discover what both *Aristotle* and *Steno* had found, was that there is another species of shark, common in the Mediterranean *(Mustelus vulgaris)* and closely related to the *Galeus lævis*, with which it is easily confounded, and this shark, though viviparous, has no placenta.

Finally there is a little Treatise by *Steno* founded on the investigation of a hare, in the one cornu uteri of which was found a fetus partly resorbed, but to the astonishment of *Steno* not putrefied. Hence he concluded that women may hope that dead fetus, which are not born in the natural way, may be resorbed without any putrefaction taking place. The fetus underlying this observation was probably a mummified one.

Various Minor Anatomical and Physiological Observations.

Steno published a number of minor scattered observations and remarks on anatomical and physiological subjects, among others on the image of the sun in the eye; on the effect of snuff on the eye; on the vesicles, which *Malpighi* found in the lungs; on the liver of over-nourished animals; on the muscular fibres of the membranes surrounding the lungs (of a swan), which he thought were of use in the respiration, &c. &c. It would carry us too far to enter upon these and other questions, as well as on *Steno's* descriptions of the particular dissections of various animals. An exception will only be made, as far as his publications on certain fishes (sharks and rays) are concerned, partly because they are most interesting in themselves, and partly because they form the connecting link between *Steno's* works on anatomy and physiology on one side and his works on geology on the other.

Rays and Sharks.

The first fishes, of which *Steno* gave a description, were two rays. Having mentioned the system of the mucous canals, also a discovery of his, he went on to describe the position of the viscera, the glands of the stomach and the intestines, and the spiral lamina of the latter, which he also was the first to describe, fully realizing its importance to the digestion, in that it makes up for the greater length of the intestines in other animals. As has already been mentioned, he also touched upon the question of the egg-shells of the rays. Furthermore he described the structure of the branchiæ, pointing out that the latter were constructed in such a manner that the water could only pass one way, the result being a constant supply of fresh water to the fish. He was of the opinion that the fishes were breathing in this manner, but said that the term *respiratio* might not be the correct one, when the matter in question was water; according to his belief the water in itself played the same part in the respiration of the fishes, as did the air in the respiration of the animals provided with lungs. It must be borne in mind that *Steno* wrote before *Boyle* and a hundred years before the discovery of the oxygen. After having meditated on the connection between the process of respiration in fishes and their lack of voice he proceeded to describe the operculum pupillare, by which

he was led into a discussion of the morphology of fishes and mammals.

A few years after his description of the anatomy of the ray *Steno* published an account of some discoveries, which he had made while dissecting the head of a big shark. Again he first dwelt on the system of the mucous canals; then he described the lateral line system of canals, which he had discovered in the eel and refound in all the fishes he had afterwards examined; but as to the purpose of these canals he declared himself to be ignorant. He next mentioned the organs of secretion in the skin of the fish and the structure of the skin in general, and here his generalizations, for once, carried him beyond the actual facts. The structure of the eye was also touched upon by *Steno,* and he was the first to correctly describe the stem which in the plagiostomes fixes the eye-ball in the orbit, as well as the optic nerve which earlier zoographers had failed to detect. At the same time he demonstrated the existence of a chiasma, which is lacking in other fishes, and called attention to various facts concerning the central nervous system, among others, as has already been mentioned, to the small size of the brain. In connection with this Treatise *Steno* published a brief description of another smaller shark (see above). He first mentioned, how through this dissection he found the proofs of the correctness of some of his earlier observations; he described the olfactory organ, where his attention had especially been attracted by the existence of numerous folds of the skin, which he rightly regarded as being of the same importance to the function as the folded and spongeous structure of the osseous tissue of the higher vertebrates. In the same place *Steno* furthermore maintained that the *testes* of the female mammals correspond to the ovaries of the oviparous animals; but this has already been mentioned in a previous section.

One part of *Steno's* description of the head of a big shark is, however, well worth dwelling upon, *viz.* the one which deals with the shark's teeth. *Steno* gave figures of the shark's head with its mouth open, as well as of single teeth, the figures being borrowed from the MS. of *Mercati's* as yet unpublished work *Metallotheca Vaticana;* he described, how the several rows of teeth differed in consistence, and admitted that he was unable to understand the use of those teeth, which are quite soft and lie beneath the mucous membrane. But as early as in the following Treatise he set forth as his supposition that these soft teeth were meant to succeed the hard teeth, according as the latter were falling out, and in his work *De Solido Intra Solidum* &c. he finally arrived at a clear conception of their importance. He also made comparisons between sharks' teeth and the bodies, which at his time were called *glossopetræ.* As to the formation of the latter the then current views were very much at variance; but the

Geology.

theories, which were most generally accepted, tended towards the explanation that, like so many other bodies which were found in the earth and exactly resembled parts of animals or plants, they had been formed in the earth, at the place where they were found, either by a force inherent in the earth *(vis plastica)*, by a *lusus Naturæ*, or by the Creator himself; and as to the immanent forces of these bodies the current opinions were alike unscientific. Contrary to most of the naturalists of those days *Fabio Colonna* had declared *glossopetræ* to be simply sharks' teeth in a fossil state. This also was *Steno's* opinion, and perceiving how close was the resemblance between sharks' teeth and the *glossopetræ*, and furthermore taking into account the nature of the soil in those parts where *glossopetræ* were found, he was, through the following considerations, led to nothing less than the foundation of scientific geology; for he rightly perceived that what was true in the case of sharks' teeth, was necessarily also true in the case of all other parts of animals or plants found in the earth, and the six *conjecturæ* he laid down consequently comprised all such bodies: 1. *Terra, unde animalium partibus similia corpora eruuntur, corpora illa hodie non producere videtur.* 2. *Eadem terra non videtur fuisse compacta, cum prædicta corpora ibi producta sunt.* 3. *Nec forte repugnat, qvo minus eandem terram aqvis olim tectam fuisse credamus.* 4. *Nihil qvoqve obstare videtur qvo minus credamus, eandem terram aqvæ olim fuisse immixtam.* 5. *Nec qvicqvam obstare video, qvo minus eandem terram pro aqvæ sedimento sensim congesto habeamus.* 6. *Nihil obstare videtur, qvo minus animalium partibus similia corpora, qvæ e terris eruuntur, pro animalium partibus habeantur. Steno* gave good reasons for these conjectures; but as to his proofs reference must be made to the work itself. One point, however, is still to be mentioned, that in his list of contents *Steno* says that in earth from Malta are found vertebræ of fishes, closely resembling a vertebra still sticking in the clay, which *Fr. Maria Fiorentini* had shown to him, a circumstance which certainly strengthened his opinion concerning the nature of the *glossopetræ*. Finally *Steno* touched upon the question of the way in which mineral substances come to fill up the spaces formerly occupied by organic bodies, having cast themselves entirely in the mould of the latter.

As mentioned above the large, geological work, which *Steno* intended to write, was never accomplished, and only a *Prodromus* is extant. Because of the brief and condensed form of this work, so abounding with new ideas, it is impossible to give an account of it in a still more condensed form. Here again the reader must be referred to the book itself, though a few remarks on the state of geology at the time of *Steno* might perhaps be appropriate in this connection. It was universally taken for granted that the Earth had come into existence only a few thousand years ago, created in the way which has

been recorded in the *Genesis*. It was further presumed that the surface of the Earth, together with its animal and vegetable life, had undergone no essential changes, apart from those which had been occasioned by the Deluge and the inundations and volcanic eruptions mentioned by the historical writers. As to the difference between the various strata of the Earth the knowledge of those days was very imperfect, and as to the origin of the several strata it was practically *nil*. The fossils occurring at certain places were, as has just been mentioned, looked upon as having been formed on the spot by means of an immanent force, or produced by the Creator himself. Whichever the view taken, there was no difficulty in accounting for the occurrence of bodies, which *e. g.* resembled sharks' teeth or other parts of animals living in the sea, at places far from the sea, nay, even on mountains. If, on the contrary, these bodies were looked upon from the point of view of having really once belonged to animals, which had their home in the sea, there arose the apparently invincible difficulty of explaining how they could have reached these places far from the sea, where they are found, often in great numbers.

The contents of *Steno's* work will, as has been mentioned above, not be reported in this place; only its main lines will be set forth, and these as briefly as possible. After a thorough observation of the bodies exactly resembling animals or parts of animals which are to be found in the earth, and after a minute examination of the qualities of the soil, in which they are found, *Steno* arrived at the absolutely unquestionable result that these bodies are remains of animals, and that these very bodies, if in every respect resembling animals living in the sea, must be the remains of such marine animals, and, finally, that they, together with the earth in which they are imbedded, must be sedimentary deposits. *Steno* finds that while certain strata of the Earth contain such bodies — fossils — there are others which never contain them, and the latter he rightly looked upon as the oldest, those which have formed the original Earth, on the surface of which the fossiliferous layers have been deposited as sediments of the sea. He further shows that each of the fossiliferous layers originally had an upper and a lower horizontal and level boundary plane, naturally produced by the way in which it has been formed. An exception from this rule is only the oldest and deepest fossiliferous layer, the upper surface of which, it is true, is horizontal and level, while the lower one has the form which corresponds with the surface of the non-fossiliferous layer beneath it. *Steno* furthermore points out that at those rather numerous places, where the fossiliferous layers are limited by planes, which are not horizontal, the limiting planes are still level and parallel to one another, for which reason their situation, deviating as it is from the original horizontality, must be looked upon as secondary, either

produced by the collapsing of deeper layers — *e. g.* through the influence of water and fire — beneath the upper layers, which then have shared in the collapse; or by the raising of deeper layers — *e. g.* by volcanic eruptions — which at the same time have raised the layers above them. Thus he also accounts for the occurrence of layers containing marine animals far above the present surface of the sea. — As the basis of his theory *Steno* had only the observations, which he had had the opportunity of making in Tuscany when travelling about the country in the company of the Grand-Duke, and although Tuscany is especially favourable for observations of this sort, we can not but admire him for having found the time to make such a number of excellent observations as he did, but also more especially for the way in which, from out of his knowledge of such a very small part of the entire surface of the Earth, he was able to make generalizations applicable to the whole of the globe. *Steno's* explanation of the formation and the occurrence of the fossils, as well as of the nature and position of the various strata, is the one still in force in our own days; for after having fallen into oblivion for more than a century its position was established in the beginning of the nineteenth century, especially through *Elie de Beaumont,* who translated great parts of *Steno's* book, thus showing how far he had reached, even at such an early date. There are two points, however, in the history of the formation of the Earth, in which *Steno's* knowledge is decidedly behind that of our time. Firstly, with regard to the changes which in the process of time have taken place in the surface of the Earth, where — for external as well as for internal reasons — he had to keep within that limited space of some few thousand years, which according to the doctrine of the Church had elapsed since the creation of the world, for which reason he had to prove, what appears to have given him some trouble, that all the changes in the surface of the Earth *can* have taken place during that short space of time. Secondly, he had to let all changes be occasioned by violent revolutions in nature, partly to bring them within such a limited space of time, partly because, with the knowledge of those days, he could have no idea of the changes slowly and daily taking place in the surface of the Earth, and of the immense effects of these changes through exceedingly long periods.

Steno's examination of bodies found in the earth was, as the very title of his book suggests, not limited to the remains of animal and vegetable life, that is fossils, but comprised all solid bodies, which in nature occur inclosed within other solid bodies, and thus he was also led to the study of crystals. Even scientists who had especially devoted their time to the investigation of crystals and their occurrence, as for instance *Steno's* friend *Montanari,* were of opinion that crystals still were being formed in the cavities of rocks, having a vegetative growth, and

drawing nourishment on that side where they stick to their matrix; it was likewise a current belief that if crystals were removed from the spot, where they were fixed, others would form themselves at the same spot. The explanation which *Steno* offered of the formation of the crystals was quite different from the latter theory; being based upon ingenious observations and conclusions it is once more the explanation, which holds good to this very day. *Steno* admitted that he was quite unable to determine the manner of the first delineation of crystals, but he maintained that crystals only increase in size in fluids and that the growth, when once begun, will continue through the medium of new crystalline matter, *materia crystallina*, being put to the planes of already delineated crystals. *Steno*, however, did not rest satisfied with this. After a thorough examination of different crystals — crystals of quartz, iron ore, pyrites and others — he showed that every crystallizable substance crystallizes in its own particular form, of which crystal forms he gave very exact descriptions with illustrations, being likewise the first to mention that the opposite planes of crystals are always parallel to one another. *Steno* also made numerous other valuable remarks and observations concerning crystals, which it would take too long to enumerate in this place.

Not only did *Steno's* principal work on geology never appear; but even of smaller writings on geological subjects only two short Letters to *Cosimo III* are extant, containing descriptions of the grottos at Gresta and Moncodine, which were, in fact, not published till long after *Steno's* death. They are interesting, in that *Steno* here points out that rock-crystal can not be indurated ice, at that time a not uncommon belief; but they are also remarkable because of the natural explanation which *Steno* gives of the fact that the temperature inside a grotto is so much lower than the temperature outside in summer time and *vice versa* in winter time, thus rendering the doctrine of the *antiperistasis* superfluous.

Steno's work in the service of science did not end abruptly; yet within a few years it rapidly diminished in quantity as well as in merit, until at last it ceased altogether, when he was only thirty-five years of age.

THE present Edition of Steno comprises all the works of a scientific nature, which are known to exist from his hands. It embraces not only the scientific works, which he himself published (II. IV. V. VI. XIII. XV. XVI. XVII. XXII. XXIII. XXIV. XXVII) and those which he left to others to publish (X. XII. XIX. XX. XXI. XXV. XXVI. XXVIII. XXXI. XXXII. XXXIII), but also those which appeared without his knowledge, such as the Letters to Thomas Bartholin and Cosimo III and his Lecture on the anatomy of the brain (I. III. VII. VIII. IX. XI. XIV. XVIII. XXIX. XXX). An Appendix has been added, comprising two fragments of Letters (XXXIV. XXXV) dealing with observations made by Steno, as well as the notes which his pupil, Holger Jacobæus, wrote on the dissections and lectures of Steno during the years of 1672—1674 (XXXVI).

In the present Edition the works of Steno are printed in the order in which the researches, forming the basis of the various Treatises, were made. This is, according to the view of the editor, all the more justifiable, as in that manner it becomes possible to follow with ease the course of Steno's researches, while if the Treatises were arranged after their dates of publication, works, which were very near to one another in subject and the dates of the researches they record, would have to be placed far apart. An arrangement of the Treatises after their contents would be quite impossible to carry through, seeing that so many of the Treatises each of them deal with such widely different subjects.

Below the half-title of each Treatise have been placed the arms of the town where the researches, which are mentioned in the Treatise, wholly or for the greater part were made, or where the Treatise was composed.

The figures on the title-pages represent the Theatrum Anatomicum *of Copenhagen at* Steno's *time. They are reproduced from* Thomæ Bartholini Cista Medica Hafniensis. *Hafniæ 1662.*

In cases where the Treatise has been edited more than once, the editor has made use of the text of the original edition. Differences between the text of the original and that of the later editions have been mentioned in the notes, except in cases where they are of no interest whatsoever. Only in Treatise II the text of the second, considerably enlarged, edition has been preferred, which edition appeared as early as one year after the publication of the first edition and was undertaken by Steno *himself. Here, too, the notes call attention to all variations of interest between the two editions.*

By far the greater part of Steno's *works are written in Latin. In all of these a uniform orthography has been carried through, corresponding as nearly as possible to the orthography of the first works of* Steno, *published in Holland in 1661—62, with the one exception, however, that the extensive, but inconsequent use of accents has been abandoned. Unquestionable misprints have simply been corrected, while in cases, where there is any uncertainty whatsoever as to the justice of the corrections made, the original reading has been given in the notes. This also applies to the Treatises which are written in French, Italian and English, but in the latter only mere misprints have been corrected, the orthography being otherwise exactly reproduced. In quotations from other writers* Steno *makes use of his own orthography; where there is any important difference between the quotations, as found in* Steno, *and the same passage in the writer quoted, these differences have been mentioned in the notes, whenever the works in question have been within the reach of the editor.*

In the extracts from the MS. of Jacobæus *the same orthography has been carried through as in the text of* Steno.

Here as well as everywhere in the text of Steno *the abbreviations have been expanded, partly to make the understanding easier, partly for typographical reasons.*

The figures have been executed from photographs after the figures of the original editions, except a few of the figures in Treatise XXII, which unhappily have been reproduced by tracing the figures. The great plate in vol. II facing p. 238 and the figures in the MS. of Jacobæus *have been executed from photographs of the original drawings. With a very few exceptions, of which account has been rendered in the notes, they have all been reproduced in the size of the original.*

The object of the notes is:

1. To give concise information as to the facts mentioned by Steno, *in cases where these facts cannot be supposed to be immediately intelligible to readers with an ordinary scientific training.*

2. To give an account of the different, more important readings in the various editions of Steno's *works.*

3. To give the correct and complete titles of the works, to which reference has been made by Steno, *as well as to show where in these works the quotation or the passage referred to by* Steno *is to be found.*

4. To give short biographical data about the persons mentioned by Steno. *In the case of the Danes these data have been made a little more complete, as the foreign reader will have greater difficulty in procuring satisfactory information about them. Reference has generally been made to biographical dictionaries, such as must be supposed to exist in every larger library, only in a few cases to monographs on the persons in question.*

On the other hand no attempt has been made to give, in the notes, longer historical explanations of the relation of science to the various scientific questions, which have been treated in Steno's *works, seeing that this would carry us much too far and naturally belongs somewhere else.*

The quotations in the notes have been printed with the orthography of the work, from which they have been taken, so also the titles of books. Exceptions are such quotations and titles, as the editor only knows at second hand. For typographical reasons it has also been impossible to render several of the abbreviations.

The most important biographies of Steno *are:*

Domenico Maria Manni, *Vita Del Letteratissimo Monsig. Niccolò Stenone Di Danimarca Vescovo Di Titopoli E Vicario Apostolico. Firenze 1775.*

Angelus Fabronius, *Vitae Italorum Doctrina Excellentium, Qui Saeculis XVII. Et XVIII. Floruerunt. Pisis 1778—1805. vol. III. 1779.*

J. Wichfeld, *Erindringer Om Den Danske Videnskabsmand Niels Stensen — Nicolaus Steno. Historisk Tidsskrift, 3 Række, 4 Bind. Kjøbenhavn 1865.*

C. C. A. Gosch, *Udsigt Over Danmarks Zoologiske Literatur, 2 Afdeling, 1 Hefte. Kjøbenhavn 1872.*

Wilhelm Plenkers S. J., *Der Däne Niels Stensen. Freiburg im Breisgau 1884.*

A. D. Jørgensen, *Nils Stensen. København 1884.*

I REGRET that it will be quite impossible to me to enumerate each one of the many, who have kindly placed their time and knowledge at my disposal, whenever I asked them for help. I must here content myself by begging them, one and all, to accept my best thanks.

There are, however, three men, to whom I am under special obligations for their valuable and indefatigable assistance: *V. KUHR*, M. A. for his competent and careful assistance as regards the philological part of the work; *CARL S. PETERSEN*, Librarian at the Royal Library of Copenhagen, for the never failing kindness with which he has let me profit by his extensive knowledge, and *R. H. STAMM*, M. S., Lecturer at the University of Copenhagen, for much valuable information, especially as regards zoological matters, for all of which I beg these three men to accept my most heartfelt thanks.

VILHELM MAAR

DE PRIMA DUCTUS SALIVALIS EXTERIORIS INVENTIONE & BILSIANIS EXPERIMENTIS

THOMÆ BARTHOLINO HAFNIAM

CUM tuum in me affectum conſidero, Celeberrime Vir, meqve nihil tale promeritum intueor, non poſſum, qvin ſummam tuam humanitatem ea, qva par eſt, veneratione proſeqvar: Tot enim tui amoris ſe manifeſtant argumenta, ut vel hinc mihi pateat, Veteres optimo jure

Præceptores ſancti voluiſſe Parentis
— — — Eſſe loco,

diemqve, qvo in diſcipulorum numerum a te adoptatus ſum, natali merito cenſeam comparandum. Qvid enim aliud ſibi vindicant humaniſſimæ tuæ litteræ, digna cujus omnibus cum magna gratiarum actione reſponderem membris, niſi ſingula tanta eſſent, ut peculiarem ſibi reſponſionem flagitarent? Qvod cum mea infantia non permittat, ſatius duco grata hæc mente recondere, qvam, verbis proletario more gratias agendo, leviora qvam pro rei dignitate proferre.

Cum vero, ut ductus ſalivalis exterioris iconem edam, in eadem epiſtola author mihi ſis, non poſſum, qvin & invidiam, qvam hæc mihi inventiuncula peperit, & ſimul, qvem ex hac invidia percepi fructum, paucis tibi exponam, non ut in muſtaceo laureolam qværam, ſed ut invidioſum plagii crimen a me rejiciam. Doleo namqve, eam mihi imponi neceſſitatem, ut vel de re non ita magni ponderis multa fari, vel turpem ignominiæ notam ſubire cogar. Res qvidem ipſa rite ponderata id neqvaqvam meretur, maxime cum ſimilis omnino ductus jam ante fuerit inventus, qvin ipſe, de qvo in præſens agitur, a *Caſſerio,* licet muſculi nomine (qvod ex tuis in

buccinatoris muſculi hiſtoria didici *Inſtitutionibus)* obſervatus: Cum tamen, qvod ejus gratia mihi intentatur, crimen ſilentium minime patiatur, tibi, ut Præceptori diſcipulus, totam rem enarrabo, tuoqve judicio, qvid inde decernendum, relinqvam. Sæpius jam a Clariſſimo *Sylvio* & a Celeberr. Dno. *van Horne* ſecundo exhibitus publico ductus ille fuerat, cum aliqvot inde hebdomadibus, qvam ob cauſam neſcio, abalienatus a me Clariſſ. *Gerard. Blaſius* tantum ſuis tribueret affectibus, ut, licet ductus iſtius inqviſitioni manum nunqvam admoverit; licet, cum ſemitruncatum illi primo exhiberem, qvid eſſet, non valuerit ſignificare; licet in ſuis ad *Eyſſonium* litteris Frater ejus paucis, anteqvam hæc mihi ſignificarentur, diebus inventionem illius mihi tribuerit; licet ipſe tandem in ultimo de *Medicina Generali* ſcripto, rei, qvam ſe reperiſſe ait, nec verum aſſignet ortum, nec exitum verum: nihilo minus Clariſſ. Viris *Sylvio* & *van Horne* per Fratrem, hinc prædicto in libro omnibus ſibi illam deberi, ſignificaret. Qvæ ut manifeſtiora evadant, veniam dabis, ſi & inventionis occaſionem, & qvid inde actum, paucis expoſuero.

Annus eſt, cum ego, a *Blaſio* hoſpitio exceptus, obſervans in illo, cui tertia ab adventu meo hebdomade finem imponebat, collegio commodam ſubjecta Anatomica habendi occaſionem, ſollicitarem Clariſſ. Virum, liceret, qvæ mihi comparaturus eſſem, propria manu diſſecare. Qvod cum impetraſſem, faventem adeo ſenſi fortunam, ut in primo, qvod 7. April. mihi emptum in Muſeolo ſolus ſecabam, ovillo capite ductum, a nemine, qvod ſciam, deſcriptum, invenirem. Detractis qvippe communibus velamentis ſectionem cerebri meditabar, cum forte vagantia per ora vaſa prius examinanda judico. Eo itaqve fine venarum arteriarumqve vias immiſſo ſtylo explorans, apicem obſervo non ulterius intra tunicarum anguſtias coactum ampla in cavitate liberius vagari, moxqve ferrum protrudens ipſos ſonare dentes audio. Miratus rei novitatem Hoſpitem voco, ſententiam ejus auditurus, qvi primo vim accuſare, mox ad ludentem ſæpius Naturam confugere, tandemqve *Whartonum* ad partes vocare. Sed cum nec ibi qvicqvam offenderet, nec tractata negligentius vaſa longiorem inqviſitionem admitterent: majori cum attentione hæc alia vice examinare decrevi, qvod & paucis inde diebus in canino capite, licet obſcurius, ſucceſſit. Cum itaqve uſum vaſis argueret magna cum inferiori affinitas, eodem menſe Præſtantiſſimo Dn. *Jacobo Henrico Paulli,* amico conjunctiſſimo, me vaſculum ali-

qvod ſalivale inveniſſe, ſignificavi, adjuncta aliqvali ejuſdem deſcriptione. Sed qvandoqvidem ſimile qvid jam tum inventum ſcirem, nec, an aliis idem fuerit obſervatum, divinare poſſem, ſilui, donec data occaſione Clariſſimum *Sylvium* ea de re conſulere liceret: Qvi his auditis in homine qværendum illum judicavit, inventumqve Spectatoribus aliqvoties demonſtravit.

Habes hic, Clariſſime Vir, inventionis hiſtoriam: Sed ut certior ea de re ſis, en argumenta ab ipſis mihi accuſatoribus ſubminiſtrata. Junior *Blaſius*, J. D. & Advocatus, qvi ad Majum uſqve menſem eodem anno Amſtelodami degebat, qvi ædes noſtras qvotidie adibat, qvi ſectionibus, qvas a Fratre ejus adminiſtratas vidi, omnibus intererat: hic, cum illius vaſis mentionem publice factam a Domino *van Horne* audiviſſet, miſit eo nomine ad *Eyſſonium*, Profeſſorem Groningenſem Celeberrimum, litteras inventionem ejus mihi tribuendo. Qvis credet itaqve, Fratrem cum Fratre, dum Amſtelodami viveret, qvotide loqventem, novitatis, ſi qvis unqvam, avidiſſimum, rerum Anatomicarum peritum, a Fratre reperta ipſi non adſcripturum? Unum ab ipſis ſuppeditatum mihi telum vidiſti; liceret etiam plura proferre, ſi operæ pretium videretur: Sed qvamvis in privatis litteris *Blaſius* non rationibus ſe tuendo, ſed convitiis, meqve mendacem, iniqvum, malevolum, invidiæ fermento inflatum, & neſcio qvid non, appellando meritus ſit, ut non modo, qvæ pro me facerent, omnia proferrem, ſed &, qvibus me oneravit, in ipſum rejicerem; cum tamen, qvæ in me conjecit, nunqvam probaturum ſciam, qvæ in illum retorqvenda, pleriſqve adeo nota ſint, ut meo non indigeant præconio; ſi in tam nobili loco, in tanta omnis generis eruditorum corona & qvidem iterato nomen meum ductui iſti a Clariſſ. Domino *van Horne* non fuiſſet additum; de jure meo lubens ceſſiſſem. Jam vero ne in conſcientiam trahatur modeſtia, de illata mihi injuria vel invitus conqveri cogor. Ut vero ad alia tandem deveniam, unum adhuc, qvod validiſſimum judico, addam. Ipſe *Blaſius* in eo, qvem de *Medicina Generali* ſcripſit, tractatu, ſe nunqvam in ductum illum inqviſiviſſe, manifeſto indicio prodit; nec enim veram illi originem, nec egreſſum verum tribuit, qvin ipſi, unde ſcaturigines habet, glandulæ uſum adeo ignobilem adſcribit, ut niſi me illum ei exhibuiſſe certus eſſem, nunqvam illi viſum affirmarem. Patebit hoc magis in illa, qvam ſub manibus habeo, diſputatione. Qvandoqvidem enim parotidum affectus & alii vicinarum partium

morbi, qvi ex hiſce aliisqve a me obſervatis lucem aliqvam accipere videntur, accuratius examen reqvirant; non abs re fore credidi, ſi interea exercitii gratia de glandulis qvibuſdam capitis cum earundem, ut in vitulino reperiuntur, vaſis diſputationem adornarem. Hoc enim parum æqvæ illius accuſationi debeo, qvod, cum vitulinum caput, in qvo ſe vaſculum hoc reperiſſe ait, ad deſcriptionis illius normam examinarem, non modo ne umbram qvidem illius in vitulo viſam illi manifeſte obſervarem, ſed & nova qvædam lymphatica notarem. Parotidum namqve examen & cum maxillarium, inferiori collatio in trium glandularum natura qvidem a prioribus diſſidentium, per vaſa autem commercia cum iiſdem exercentium, inqviſitionem deduxit: e qvibus ſalivales glandulæ duas, interior unam, alteram exterior, ſibi aſſociarunt, tertia in collo ſita, ſuperiore ſui parte, qvæ gibba eſt, a duabus illis vaſa accipiens, novum ab inferiori & concava parte ſatis conſpicuum canalem deorſum mittit, qvem reſectum a trunco caput ulterius proſeqvi vetabat. Sed de his in dicta diſputatione uberius, modo & clarius interea licuerit in alio eadem notare, cum alio ductu, qvem in thorace vidi a thoracico & ſitu & contenti colore diſcrepantem, de qvo nihil obſervavi præter ductum ſatis longum in ſiniſtro thoracis latere ultra noni nervorum paris interiorem ramum ſitum, adqve glandulas jugulares adſcendentem, qvem, ſi a fonte ad oſtium uſqve accuratius proſeqvi dabitur, una cum cæteris tibi, ut qvi primus hæc vaſa detexiſti, & cui, qvos inde rivulos alii addidere, omnes debentur, in grati animi ſignum, cum aliter gratum me oſtendere non liceat, offeram.

Cum autem vaſis illius meminerim, afferam experimentum, qvod prædicta in alio cane fruſtra qværenti ſe præter opinionem exhibens a *Bilſii* partibus prima fronte magis eſſe apparuit, qvam revera fuit. Dum enim paſtum nuper canem a cœna illico aperio, primo ſtatim adſpectu egregium præſentibus ſpectaculum exhibuere albis lacteorum gyris undiqve picta inteſtina, ut ſangvini ad illa delato recurrens inde lac copia cedere vix putarem. Sed qvia receptaculum nondum lacte tinctum, & thoracicus valde exilis, vinculo huic injecto in craſtinum canem repono. Seqventi die, qvæſitis fruſtra cæteris, ad ciſternam rediens omnia mutata reperio; ipſa enim pridie arcta, & nihil minus qvam lac referens, albo humore jam diſtenta tumebat. Thoracicus etiam, vix tum conſpicuus, ſimili modo turgens plurimos oſtendebat ramulos poſt brevem digreſſum in eun-

dem, unde orti, truncum redeuntes, qvod vero huc præcipue facit, a receptaculo ad glandulam ingvinalem uſqve productum vas totum lacte plenum conſpiciebatur, licet qvidam e rivulis ad idem vas aliunde tendentibus lympham colore aqveo proderent. Mirabar initio, qva ratione in glandulam derivatum lac valvularum repagulo non fuerit retentum, ſed mox concidentes interdum in mortuo valvulas reſiſtendo non eſſe facile videbam, maxime ſi compreſſo ſemel vaſe lateri, qvod a Clariſſ. *Sylvio* audivi, applicentur. Nec dubito, qvin hæc *Bilſium* fallant, qvi, ut ſuccum exprimat, vaſa comprimit, unde admotæ lateribus valvulæ commeanti ultro citroqve liqvori facilem tranſitum condunt. Cætera iſtius viri myſteria qvod attinet, minoris ſenſim fieri videntur, cum & Balſamo condita a Celeberr. Dn. *van Horne* manus mumiis illius palmam dubiam faciat, & ſectio ſine ſangvine non adeo difficulter poſſet adminiſtrari. Cum enim, ligaturis ſe uti, nobis retulerit, facile apparet, qva ratione ex una parte corporis in alteram derivari poſſit ſangvis vivente adhuc animali. Ligato qvippe in vicinia cordis aortæ trunco deſcendente cum adſcendente cava, non dubito, qvin cor omnem ex inferiori corporis regione ſangvinem exhauriens ſuperiorem ſit repleturum, eoqve modo facile foret vacuatas ſangvine partes pro lubitu ſecare, & viciſſim, qvæ viſum alias fugiunt, vaſa humore turgentia oculis ſubjicere videnda. Tentaſſem hæc, ſi in vivorum ſectione magis fuiſſem verſatus, nec anguſta domi res ab illis me experimentis, qvæ & ſumptus reqvirunt & tempus, retraxiſſent. Magnam nihilominus ſpem injecere mihi noviſſimæ tuæ litteræ, qvibus & ad ſtudia hæc me animare voluiſti, teqve mei memorem data occaſione futurum aſſeverare. Mæcenates namqve illi non defuturos ſcio, cui ſuam ea in re operam tantus vir pollicetur. Sed nimium te detineo. Vale, Clariſſime Vir, meqve tuo favore dignari perge.

Dab. *Lugd. Batav.* Ao. 1661. 22. Ap.

T.

Obſeqv.

NICOLAUS STENONIS

II

DE GLANDULIS ORIS & NOVIS INDE PRODEUNTIBUS SALIVÆ VASIS

PERILLUSTRI & GENEROSISSIMO HEROI,

D. OTHONI KRAGIO,

Dno. de Wolberrig, Senatori Regio Ampliſſimo, & ad Celſiſſ.
Belgii Fœderati Ordines Exlegato Graviſſimo, arcis
& territorii Neoburgenſis in Fionia
Gubernatori,

ADMODUM VENERABILI & VIGILANTISSIMO PATRI,

D. D. JOHANNI JOH. SVANINGIO,

Daniæ & Norwegiæ Archiepiſcopo Conſummatiſſimo,
in Collegio Status Aſſeſſori & Collegii
Conſiſtorialis Præſidi,

CLARISSIMO & EXPERIENTISSIMO VIRO,

D. D. THOMÆ BARTHOLINO,

Ser. Reg. Maj. Dan. & Norw. in Acad. Hafnienſi Profeſſori
Honorario Celeberrimo, & Facult. Med.
Decano,

Mæcenatibus, Promotoribus, Præceptori
obſeqvio æternum devinctus

Humiliter & officioſe

NICOLAUS STENONIS
D. D. D.

INTER *alia, qvæ cauſæ ignoratio mirandis accenſet, ſummam meretur admirationem illa menti humanæ divinitus conceſſa vis, qva recepta per ſenſus rerum ſimulachra, qvandocunqve placuerit, ſibi repræſentat, & res abſentes qvaſi præſentes, omnesqve, qvas in ipſis ante obſervavit, partes in imagine intuetur eadem figura, magnitudine, colore, ſitu, melius longe ac ſi a* Protogene, *cujus etiam rudimenta cum naturæ veritate certabant, ad vivum fuiſſent delineatæ. Adeamus enim, qvi rerum naturalium rationes ſcrutandi avidus inter experimenta ætatem conſumpſit, ſenem, ſed viridi ſenecta gaudentem, eumqve intra tam parvæ capacitatis ſphæram, cranium intra, immenſum & per ſpatia fere infinita extenſum univerſum univerſiqve membra animo percurrere mirabimur. Hic ad aſtra evolans conſtantem fixorum ordinem, fallere neſcios planetarum errores, omni lege carentes cometarum excurſus nobis evolvet; inde momento relapſus aërem pervagabitur, & jucundas colorum varietates, ſtupendas ignium formas in illis regionibus ſe per intervalla oſtendentes depinget; hinc in terram deſcendens, varia, qvæ ſe ibi offerunt, accuratiſſime elaborata Naturæ opera, & illis vix cedentia artis imitamina exponet: tandem in terræ viſcera penetrabit, & abdita mineralium myſteria revelabit. Has ille ideas omnes nutui ſuo habet obſeqventes, ac ſi macrocoſmus microcoſmo lateret incluſus. Sed ut illa facilis adeo receptarum imaginum omnium conſideratio miraculo plena eſt; ita ſingularum receptio, ſi rem integre repræſentabunt, magno cum labore & difficultate conjuncta, & vix unqvam ab ullo ſperanda. Mens enim in varietate delectationem qværens adeo in potentia ſua impotens eſt; ut, dum in rerum examine verſatur, τὸ hoc age ſibi non poſſit imperare, nec ab aliis cogitationibus adeo vacuam ſe reddere, ut uni ſoli vacet conſtanter: partium autem, e qvibus naturalia corpora com-*

ponuntur, juncta multitudini ſubtilitas tantâ eſt, ut vel maxime attentum fallat & eludat. Qvid miramur itaqve, licet ab omni ævo multi ſummo labore & ſtudio indefeſſo id egerint, ut animalium fabricæ ideam omnibus numeris redderent abſolutam, eandem nihilominus etiamnum mutilam deprehendi & imperfectam? Qvod ſi enim, qvi exteriora duntaxat integri animalis lineamenta penicillo imitantur, nunqvam circumſpecte adeo omnia obſervant, qvin ejuſdem artis peritior accedens alius alia inveniat delenda, ſupplenda alia, alia mutanda, qvid ab illis, qvi præter exteriorum partium inter ſe proportionem etiam interiorum omnium imagines cerebro inſcribere nituntur, majorem exſpectamus perfectionem? Artificioſa ſingularum textura, Dædalea junctarum coagmentatio tot involvuntur admirandis, tam uberem qværendorum ſegetem oſtendunt, ut, licet multorum in unum conſpiret labor, licet longa annorum ſeries accedat, vix tamen certam earum cognitionem exſpectare liceat. Sunt, fateor, qvi ad illam, de qva loqvimur, ideam perficiendam faciliorem patere viam ſibi perſvadent, nec opus, ut externis omnia ſenſibus ſubjiciantur, poſſe ſolam rationem, qvæ deſiderantur, cætera ſupplere. Sed eodem & ego jure exiſtimarem, ut heroicam Alexandri Magni *gravitatem mutæ* Apelles *imagini daret, ſuffeciſſe tumultuariam ſpirantis faciei inſpectionem, potuiſſe eum, qvæ eadem velocitate aſſeqvi non valuit, ex ingenio ſufficere. Vereor autem, ne illorum cenſuram mererer, qvi dicerent, heroicam qvidem majeſtatem eo modo exprimi, non autem majeſtatem* Alexandri. *Sic & præſenti in negotio, qvamvis ingenii in novas ex ante obſervatarum conjunctione & ſeparatione figuras gignendo magna vis ſit, qvamvis nihil illi facilius, qvam varias ejuſdem rei cauſas comminiſci, ubi tamen res ipſa ſilet, qvicqvid illud loqvitur, poſſe qvidem id ita eſſe, firmiſſimis demonſtrat argumentis, eſſe autem, aſſeverare non ſuſtinet. Id qvod latius diducerem, niſi veſtra,* Magni Viri, *in re mentis vires ſpectante cognitio, qvantum humana ſors patitur, perfecta ruborem mihi incuteret, ne dicam, ſilentium imperaret. Vos enim, & Veterum monumentis eruditi, & longo rerum uſu docti, in ipſa hujus Deæ adyta penetraſtis, adeoqve, qvid ad conceptus qvam integerrimos formandos reqviratur, penitius pervidetis. Suffecerit itaqve unum item & alterum duntaxat exemplum attuliſſe, ex lymphaticorum hiſtoria petitum. Qvis per tot ſecula, etiam ab ingenio paratiſſimus, vel per ſomnium de lymphaticis cogitavit, anteqvam tuis ea, Clariſſ.* Bartholine, *non mentis, ſed corporis obſervata oculis, omnium oculis exponeres? Sed ab illo tempore, qvis ſolo ingenio, qvæ etiamnum latent, valuit revelare?*

Quis in hepate vel in reliqvo corpore, unde lymphaticorum extrema oriantur, certo argumento demonſtrare? Eandem obſervationum neceſſitatem ſalivæ origo comprobat: qvam in os deponentes vias ſenſuum ope deſtituta ratio nullas invenit; nec, qvæ materiam ejus glandulis advehunt, qvantum ego qvidem mente aſſeqvi valeo, certæ unqvam nobis erunt, ſi a ſolo ingenio exſpectandæ. Rationi accedat, oportet, obſervatio, & ſecundum omnes, qvantum licet, partes res ipſa examinetur, ut rem vere exhibens menti inſcribatur figura. Qvod dum pro virili qviſqve hoc ſeculo agit, ſuasqve eo fine examinandas proponit obſervationes, non potui, qvin & ego, qvæ ad lymphaticorum non modo revehentium uſum, ſatis alias confirmatum, illuſtrandum, ſed & evehentium numerum augendum conferre obſervavi, publico proponerem, & magnis, qvos alii congeſſere, acervis parvulum adderem manipulum. Ne autem ſine patronis hic eſſet libellus, vobis, magna Patriæ lumina, & veſtro eum nomini inſcripſi, cum illud naturale divini ingenii veſtri lumen ſvaderet, multiplici uſu acqviſita ſagacitas flagitaret, magna partim in me, partim in meos promerita juberent. Sereno itaqve vultu hæc qvaliacunqve fortunæ laborum meorum initiis benignius adſpirantis munera excipite, & qvi felicem per plurima luſtra vitæ decurſum, & nunqvam morituram nominis gloriam vobis opto & voveo, ulteriori favoris veſtri aura fovete.

Lugd. Batav. *Anno 1661.*

II

§ 1.

QVISQVIS cum convicto a *Socrate Ariſtodemo* admiſerit, qvod omnes ſana ratione utentes admittere tenentur, animalium fabricam σοφοῦ τινος δημιουργοῦ, καὶ φιλοζώου τέχνημα eſſe, non inficiabitur, cum omnia illorum membra partesqve in membris contentæ omnes προνοητικῶς ſe factas ipſæ pæne loqvantur, cum tam minutum nihil videatur, qvod ſuo non deſtinatum ſit uſui, nihil tam abjectum, qvod Conditoris ſapientiam non doceat, demonſtret, ut dexteritatem *Apellis* olim ſimpliciſſima artisqve ignaro ridenda linea. Si enim qvi & mentis & motus expertia ſimulachra fingunt, ne qvid deficiat, ne abundet aliqvid, ut omnia, etiam minima, qvam accuratiſſime elaborata ſubjiciantur oculis, ſtudioſe conantur; ſi architectus vitio ſibi ducit in exſtructo a ſe ædificio vel tantillum ſpatii otioſum, nec certo ſcopo deſerviens, relinqvere: qvis credet ab illo, qvem conſummatiſſimi qviqve artifices ad imitandum ſibi, licet impari ſucceſſu, proponunt, inanem ulla in parte locatam operam, & fruſtra qvicqvam productum? Qvis non potius, etiam in minimis maximum, imo admirandum latere artificium, judicabit?

§ 2. Proinde dolendum, fuiſſe inter magni nominis viros, qvi non pauca tantum σημείου χάριν in animalibus facta dicere ſuſtinuerint, cum menti conſilioqve divino nihil magis repugnet. Dolendum magis, eſſe, qvi de qvibuſdam ſummi terrarum Architecti operibus abjecte adeo ſentiunt, ut, qvod exilia videantur, qvod magnum primo intuitu apparatum non oſtentent, qvorum inqviſitioni tempus impendatur, indigna judicent, imo verbis ipſa, pæne contumelioſis, rejiciant. Humanæ qvidem infirmitatis eſt, qvod, qvi ſenſibus non utentes, ſed abutentes, non niſi jucunda & ſplendida ſectantur, ἐν πορφύρᾳ πίθηκον venerantes, Silenos *Alcibiadis* tranſeant, di-

ligentiſſimi Naturæ ſcrutatores futuri, ſi Epicuream in omnibus (ut *Cicero* loqvi amat) Pronœa ſe noſtra exhibuiſſet. Qvod vero neglexiſſe, parum illis videatur, niſi etiam cenſoria adhibeatur virgula in iis, qvæ nulla ratione percipiuntur, non infirmitatis amplius, ſed malitiæ eſt argumentum. Prudentior olim lingva magni illius Sapientis, qvi de libro qvodam ſententiam rogatus: bona erant, qvæ intellexi, inqvit, forſan & qvæ non intellexi.

§ 3. Inter varias autem animalium partes, qvæ iniqvitatem fortunæ paſſæ, primo loco veniunt *glandulæ*, qvæ, ut τῶν βεβήλων contemptum effugere ſæpe non potuerunt, ſic neqve τοῖς ὀργίοις ἐπιστήμης τετελεσμένων cenſuram declinare, indicta cauſa, & exqviſitiori examine neglecto: cum tamen talium ſæpe morborum authores fuerint, ut, qvos ſimplex & inculta facies in ſui examen non perduxerat, qvos ſummum Conditoris artificium in aliis manifeſtum in ſimilem de his opinionem non pertraxerat, eos neceſſitas eo compellere potuiſſet, debuiſſet. Docent hoc anginæ, ſcrofulæ, parotides, bubones, cætera mala, qvæ, ut ſummo ſæpe periculo in vitalia noſtra graſſantur, ita mirandas humorum ex una in aliam partem derivationes non raro produnt: ut propterea inveſtigatio earum, & ad cognoſcendum corpus totius orbis nobiliſſimum pulcherrima ſit, & ad ſanitatem obtinendam procurandamqve neceſſaria.

§ 4. Qvæ Veterum de illis fuerit cognitio, ſi res ipſa inſpiciatur, minuta valde & exilis apparet. Cum enim qvædam nonnullis glandulis cum ſpongiis communia viderent, ſubſtitere in ſimili hoc, & ſpongiarum munus illis attribuentes, defunctos ſe munere ſuo, & rem totam detexiſſe crediderunt. Humano qvippe ingenio familiare eſt, ut, ſi qvid in eo, qvod examinandum nobis proponimus, objecto occurrerit ſimili modo cum re ante percepta ſenſus noſtros afficiens, illud prius cognitum illico menti etiam invitæ denuo repræſentetur: unde fit, ut, rei magis perſpectæ proprietates alteri tribuendo, ab ulteriori examine deſiſtamus. Sic vi attractiva Magnetis obſervata, per Magnetiſmum omnia explicare conati qvidam. Sic in homine focum ſibi & ollam imaginando alii, ne a ſimili recederent, etiam cochlearia, ſpatulas, opercula, coqvos invenere. Sic qvi antliis vaſa lympham vehentia comparant, partes, exantlantium inſtar, ex puteo (ſic illi receptaculum chyli vocant) lympham attrahere fingunt. Nec alia ratione, cum raram in glandulis, tonſillis præcipue, texturam viderent, ſpongias dixere cum illis reli-

qvas. Si hiſce ſimilibus ſepoſitis rem ipſam audire deſideres, perpauca eſſe, qvæ de illis cognita fuere Antiqvis, offendes. Nolim tamen hæc ita dicta, ac ſi Veteribus, qvorum authoritas mihi ſemper venerabilis, ſemper honorata, qvicqvam detractum eam, ut qvi haud dubie perſvaſus ſim, nihil ſimul & inventum & perfectum hactenus fuiſſe. Lumen accenderunt illi; noſtrum eſt, ut accenſum conſervetur, & luculentius eundo inardeſcat.

§ 5. Illud ſimilitudinum velum, qvo glandularum cognitio diu obducta latuit, poſtqvam viæ qvædam peculiares in illis detectæ ſunt, ſenſim cœpit removeri. Hinc enim patuit, eas nec ſuperfluas humiditates, ſpongiæ ad exemplum, imbibere, nec publicam viſcerum totiusqve corporis ſentinam eſſe; ſed uſui longe nobiliori dicatas. Cum itaqve & mihi, his ſacris operanti, licuerit qvædam (nec dum, qvod ſciam, a qvoqvam deſcripta) in illis vaſa notare, qvæ non modo ad novam illarum dignitatem ſtabiliendam facere, ſed & Medicæ arti lucem non omnino nullam præbere, & qvaſdam naturæ tantum cognitas ante vias etiam nobis notas reddere exiſtimem, non ab re fore putavi has qvaleſcunqve obſervationes publico communicare, ut qvi otio & manu plus valent, accuratius & Reip. Medicæ fructuoſius in illa inqvirant.

§ 6. Conſtitueram nuper itaqve, Clariſſimorum Præceptorum D.D. *Bartholini & Sylvii* judicio obtemperaturus, ductus ſalivaris exterioris, vaſorumqve in glandula oculi innominata obſervatorum, aliorumqve delineationem adornare, cum, Dominum *Gerardum Leonardi Blaſium*, Hoſpitem qvondam & Præceptorem dilectum, in ſuo de *Medicina Generali* tractatu ductus iſtius a me ſibi jam ante demonſtrati mentionem facere obſervans, præoccupatum mihi ex parte laborem illum putarem. Credideram enim, illum in ipſo opere, nova accurataqve, ut ait, methodo deſcripta, rem, cujus ſe inventorem in limine profitetur, qvamqve præter vix novi qvicqvam in libro illo contineri ipſe teſtatur, accurata deſcriptione perſecuturum, maxime cum non modo commoda ſe ibi offerret occaſio, ſed ſuſcepta partium corporis delineatio id qvadam neceſſitate poſtulare videretur.

§ 7. Cum vero accuratius verba ejus examinarem, videremqve, eum ductui tam brevi, tam manifeſto nec verum ortum, nec egreſſum verum aſſignare potuiſſe (ut patebit th. 15.), imo ipſam, e qva tam eleganti copioſiſſimorum rivulorum confluxu prodit, glandulam uſui adeo ignobili deſtinaſſe (ut th. 17. manifeſtum), ut, niſi ſemel atqve iterum

me illi hæc demonſtraſſe certus eſſem, nunqvam ab illo viſa crederem, in re adeo exigua tam parum ſibi conſtare, magnopere mirabar.

§ 8. Multum tamen debeo Clariſſ. Viro, qvod occaſionem dederit, non modo meum mihi vindicandi, ſed & nova qvædam alia inveniendi. Dum enim feriis Paſchalibus hujus anni parotides dictas in vitulino, qvo ille provocavit, rimor, & vaſa, qvo me trahunt, ſeqvor: elegantem variarum in collo glandularum per peculiaria vaſa conſenſum non ſine admiratione obſervo. Qvibus viſis, ut certior de illis fierem, ſecundum vitulinum caput ſeco, hinc & canes aperio, tandem qvoqve bubulum caput examino, ubi plura ſalivæ vaſa non exſpectanti ſe obtulere. Ut itaqve Præceptoribus morem geram, &, qvibus magis commodum, alii accuratius illa examinent, conſtitui hac occaſione obſervationum mearum qvalemcunqve delineationem dare, veniam, ſicubi forte errare contigerit, a peritioribus mihi promittens.

§ 9. Qvæ continuum ori humorem ſuppeditant, glandulæ non unæ ſunt, nec uno in loco ſitæ. Nam præter maxillares & tonſillas, a Clariſſ. *Whartono* deſcriptas, alias obſervavi ſub auribus, in buccarum regione, ſub lingva, in palato: qvæ omnes in eo conveniunt, qvod ex plurimis glanduloſæ carnis qvaſi fragmentis, imo glomis fibrarum, nervorum, vaſorumqve, & membranarum ope inter ſe connexis ſint compoſitæ, adeoqve ex earum genere, qvas *conglomeratas* Celeberrimus Vir *Franciſcus Sylvius* appellat. *Glandulæ* qvippe omnes proprie dictæ, licet parenchymata ſint ſui generis non ſangvinea, ſed alba, pingvia, venis, nervis, arteriisqve, & vaſis lymphaticis prædita, varias tamen, variis fundamentis nitentes, admittunt differentias: qvas inter nulla rem propius attingit ea, qvam Vir Clariſſ. modo nominatus proponit. Ille enim non vaſa, utpote qvæ necdum in omnibus detecta, nec uſum, qvippe minus adhuc cognitum, ſed ipſam conformationem reſpiciendo duo primaria illarum genera, *Diſp. Med. 5 de Lienis & Glandul. Uſu* th. 26. & 27., deſcribit: *ſunt enim aliæ ex variis qvaſi partibus & minoribus glandulis conglomeratis, & cum aliqva ſuperficiei ſuæ inæqvalitate conglutinatis exſurgentes; aliæ vero æqvalem ſuperficiem habentes, & ex una qvaſi ſibi continuata ſubſtantia conflatæ & conglobatæ obſervantur:* cui poſtremo generi & hoc peculiare eſt, qvod altera parte convexum lymphatica ut plurimum excipiat, altera vero concavum orta interius ex plurimis tenellis rivulis alia lymphatica ex ſe emittat. Ut autem glandularum, ſic & lymphaticorum, ob contenti colorem Clar. *Bar-*

tholino ita dictorum, duo genera reperiuntur. Qvæ enim in conglobatis viſuntur, omnia liqvorem ſuum in venas reducunt, cum illa, qvæ e conglomeratis prodeunt, contenta in cavitates notabiles, ut ſunt oculi, nares, os, inteſtinum tenue, deponant.

Licet autem *ſtomaticæ glandulæ* (ſic enim, qvæ ori proxime inſerviunt, omnes communi nomine poſſunt inſigniri) ejuſdem generis ſint, ſimiliaqve vaſa poſſideant, numero tamen vaſorum diſtinguuntur, qvædam enim unico duntaxat excretorio vaſe prædita ſunt, ut qvæ ſub auribus & ſub maxillis reperiuntur, qvædam pluribus, ut reliqvæ qvatuor, qvæ nempe in buccis, ſub lingva & in palato obſervantur, ut & tonſillæ, cum vero tonſillas una cum maxillaribus inferioribus earumqve vaſis *Whartonus* deſcripſerit, ea, qvæ ab aliis deſcripta nondum ſcimus, propoſuiſſe contenti, actum agere nolumus.

§ 10. *Sub auribus ſitæ glandulæ,* ut bene ſe habentes peculiare nihil & a cæteris diſtinctum Veteribus exhibuerunt, ſic nec proprium ſibi nomen apud eoſdem invenere. Videtur qvidem *Hippocr. Lib. de Gland.* hac deſcriptione illas indigitaſſe: ἀδένες δὲ κατὰ τοῖν οὐάτοιν ἔνθα καὶ ἔνθα ἑκατέρωθεν κατὰ τὰς σφαγὰς τοῦ τραχήλου; ſi vero facta hic loci glandularum enumeratio conferatur cum recenſione earundem brevi poſt in eodem tractatu propoſita, facile patet, deſcriptionem hanc generalem eſſe omnibusqve jugularibus eo tempore cognitis communem, qvas paulo infra παρίσθμια vocat, prout & *Zwingerus* in tabulis exponit, & ipſe author, verborum ſuorum optimus interpres, manifeſte declarat, dum ſe περὶ ἀδένων οὐλομελίης τραχήλου acturum ait. Qvas autem Parotidas dixerunt Veteres, non ipſæ glandulæ fuere, ſed ſub auribus, vel poſt eas, obſervati tumores, qvos alias ἐπάρματα & φήρεα nominarunt. Sic τὰ παρὰ τὰ ὦτα, qvorum toties apud *Hippocratem* mentio, licet proprie & per ſe conſiderata potius, qvæ naturaliter ibi reperiuntur, deſignent; ſi tamen ipſe divinus ſenex conſulatur, præternaturale qvid hac voce intelligendum vult. Hinc *Epidem.* I, ſect. 3: οἷσι δὲ τὰ παρὰ τὰ ὦτα γίνοιτο, qvo loco, ut, qvæ cætera proferre liceret, taceam, ſatis manifeſtum eſt, morboſum qvid hoc nomine venire, idem ſcilicet, qvod Græcam vocem Latina civitate donando Parotida *Celſus Pliniusqve* appellarunt. Licet itaqve hæc verbi vis apud illos fuerit, cum tamen ratione ſui morbi ſubjecto non minus qvam morbo conveniat, non incommode, ut communiter fit, ipſis glandulis poſſet concedi, ſi plures & diverſi generis

eodem in loco non reperirentur. Superiori enim anno jam præcipite, cum in Noſocomio praxin faciendo qvotidie doceret Clariſſ. *Franciſcus Sylvius,* exhibuit tum diſcipulis, tum qvibus intereſſe libuit aliis, inter cætera, qvæ data occaſione aperiebat cadavera, ſcrofulis affectas in qvodam conglobatas omnes non in reliqvo modo corpore, ſed & circa aurium regionem, ſalivarium utraqve cum pancreate integra exiſtente. Ut itaqve diſtincte conſiderentur, poterit hæc, de qva nobis ſermo eſt, *parotis conglomerata* appellari, nomine conglobatarum parotidum reliqvis relicto.

§ 11. *Parotis conglomerata* (ut in vitulo obſervatur) in fovea ſub auricula, inter poſterius inferioris maxillæ latus proceſſumqve maſtoideo reſpondentem conſpicua, ſuper oſſis hyoidis cornu ſita eſt, figura plane irregulari, utpote qvam circumſitarum partium aſperitates & eminentiæ admittunt. Notandum tamen, inferiorem ejus partem in longum extenuatam eſſe, media craſſiore exiſtente: unde ſuperiora verſus anterior pars in limbum expanſa, oblongam aliam & conglobatam fere totam ſinu ſuo abſcondit, qvem præter ſinum variæ pro vaſorum, præcipue vero nervorum, qvi & magni & copioſi per eam in alias partes diſtribuuntur, tranſitu viæ notantur.

§ 12. Magnitudinem pondere expreſſit Dn. *Whartonus,* qvi facta hujus cum reliqvis comparatione obſervavit parotidem pendentem ʒiiijſſ, maxillarem internam ʒijſſ. In fœtu autem vaccino hujus pondus ʒiij æqvare, illius vero ʒij deprehendit. Idem refert, ſe in eqvo exſecuiſſe unam, qvæ pendebat ℥xj, nec tamen præternaturalis erat, aut ſolito tumidior. Qvibus Clariſſ. Vir copiam materiæ expreſſiſſe videretur, extenſione non determinata, niſi jam ante conſtare putaſſet, materiam in utraqve eodem modo eſſe diſpoſitam, qvod & innuit, dum ſubſtantiam utriqve ſimilem adſcribit. Ne tamen hujus ad illam proportionem exacte obſervatam eſſe credam, ſvadet, præter nervos majores copioſioresqve per ſuperiorem delatos, minor majori incluſa glandula, qvam, utpote a reliqva non diſtinctam, pondus illius auxiſſe puto. Nam in bubulo inveni parotidem dictam, a vaſis & ſibi appoſita conglobata liberatam, pendere ʒiiijſſ, cum maxillaris inferior ʒiiij tantum adæqvaret.

§ 13. Vicinis partibus fibrarum vaſorumqve & præcipue nervorum ope annectitur. Nervi enim qvinti paris ramus durior, inſignibus eam ſurculis variis in locis perforans, tam ſuperiora qvam inferiora verſus propagines mittit, qvæ tum variis in locis, tum præ-

cipue glandulam inter & reliqvum, cui apponitur illa, caput, inter ſe varie concurrentes, plexum qvendam formant. Qvos præter alii, a ramo temporalem muſculum inter & maxillam antrorſum delato reflexi, ad vaſis excretorii latus retrorſum in ipſam glandulam feruntur. *Vaſa,* qvæ ibi reperiuntur, trium generum ſunt. Nam præter venas & arterias, a jugularium carotidumqve exteriorum externis ramis ſubminiſtratas, etiam *peculiare vaſculum* obtinuit, qvod in ovillo capite ſuperiori anno Amſtelodami a me repertum. Cum enim, a D. *Gerar. Leon. Blaſio,* Clar. Gymnaſii Amſtelodamenſis Profeſſore, circa feſtum Paſchatos hoſpitio exceptus, in illo, cui ſexta ab adventu meo lectione finem imponebat, collegio commodam animalia exercitio Anatomico convenientia habendi occaſionem animadverterem, obtinui ab illo, liceret empta mihi ſubjecta privatim diſſecare, ut, qvæ a diverſis in arte Anatomica exercitatiſſimis viris obſervaram hactenus, & mente revolverem, & manu imitarer. Jamqve eo nomine VII. Aprilis, qvod mihi comparaveram, ovillum caput ſolus in muſeolo adornabam, cerebrum diſſecturus, cum in ſui me examen decurrentes per ora venæ & arteriæ rapiunt: qvæ dum ſtylo varie ſcrutor, ſentio me, per vas aliqvod in amplam oris cavitatem delatum, ipſos dentes ferire. Miratus rei novitatem Hoſpitem voco, ſententiam ejus auditurus, qvi, cum primo vim, mox ludentem Naturam accuſaſſet, tandem *Whartonum* accuratius examinandum judicabat.

§ 14. *Oritur* autem *Vas* illud *ſalivare* intra nominatam ſæpius parotidem conglomeratam pluribus e rivulis in unum alveum confluentibus, qvi inde, in vitulino, ut & in ovillo, verſus inferiora delatus, ab inferioris maxillæ angulo ad ſinum lateri ejus imo inſculptum tendit, unde obliqve antrorſum adſurgens tandem foramine ſatis amplo, papillarum ſummæ & poſtremæ ad molarium ſecundum ſitæ inſculpto, in partem oris exteriorem patet. Notandi in eo præter propriam tunicam varii nervei funiculi, qvi, nil niſi plurima filamenta repræſentantes, utrinqve ad latera ejus feruntur, & hinc inde per prædicta filamenta ſibi mutuo innexi medium ductum amplexantur. Non mirum itaqve, difficulter adeo per diviſas tunicas in cavitatem ipſam intrudi ſtylum, cum, inter nerveos funiculos hærens, ab ulteriori progreſſu impediatur. Si in homine rectum ejus tramitem, qvo glandulam inter & buccinatoris medium fertur, conſideramus, videtur idem eſſe cum robuſto vinculo, qvod, e centro

buccinatoris exterius enatum, os genarum perreptare, & in muſculum qvendam parvum & gracilem buccæ directe oppoſitum terminari, *Caſſerius* ſcribit. Plura de eo, ut in homine obſervatur, licet a prædictis non multum differant, cum ſciam, Clariſſ. *Præſidem* in ſuis ad *Veſalium* commentariis id acturum, hic non addam.

§ 15. Videamus, qva ratione prædicta deſcribat D. *Blaſius. Medicin. General.* p. 63. hæc leguntur: *Saliva eſt humor &c., ex ſero maxime conſtans, caloris ope a maſſa ſangvinea in glandulis maxillaribus ſegregato, & hinc per ductum ſalivalem in maxilla ſuperiori æqve ac inferiori notabilem ad glandulas oris anteriores delato, ut inde motu lingvæ expreſſus inſerviat guſtationi &c.* Ergo terminus a qvo, glandulæ maxillares, terminus ad qvem, glandulæ oris anteriores; ut motum lingvæ, qvi ad expreſſionem parum facit, taceam. Glandulas autem maxillares eodem libro p. 23. ſic deſcribit: *Maxillares glandulæ, tam qvæ externæ, in media fere longitudine maxillæ inferioris ſitæ, qvam qvæ internæ, a parotidibus uſqve ad mentum ſeſe varia magnitudinis colorisqve ſpecie exhibentes, ductu ſingulari ab uſu ſalivalis dicto gaudentes &c.* Cum vero ab internis internum ductum procedere *Whartonus*, & poſt eum in prima de ductibus ſalivaribus diſputatione Clariſſimus Præſes *Johannes van Horne* oſtenderint, ab externis exterioris origo ſecundum eum deducenda. Certe ſi accuratius *Whartoni* verba, unde deſcriptionem hanc deſumpſit, examinaſſet, vidiſſet facile, tanto ductui illas nulla proportione reſpondere. Sic enim laudatus ſæpe Doctiſſimus Vir cap. 21. eas delineat: *Maxillares externæ exiguæ admodum ſunt & minoris momenti; ſitæ ſunt exterius in media fere longitudine maxillæ inferioris.* Sed qvid verbis opus, cum ipſa experientia loqvitur? Admoveat inqviſitioni manum, &, qva veritate hæc dixerit, facile inveniet: nec eſt, qvod qvis exiſtimet, eum maxillarium externarum numero ſalivares exteriores adſcribere; ne enim hac ratione poſſet excuſari, ipſe ſeqventi capite egregie cavit, ubi eas a prioribus diſtinctas parotidum nomine deſcribit. Eadem fide terminum ad qvem proponit: vidit enim, qvo modo inferiores terminentur; hinc non erraturum ſe credidit, ſi exterioribus ſimilem tribueret inſertionem. Sed longe aliter ſcripſiſſet Clariſſimus Vir, nec glandulas, unde motu lingvæ exprimeretur ſaliva, finxiſſet, ſi unqvam per foramen in egreſſu conſpicuum vel in brutis, vel homine ſtylum in ductum immiſiſſet. Sed de his ſatis, ad rem redeamus.

§ 16. Qvin alia dentur vaſa præter jam dicta, non dubitarem, qvandoqvidem non modo a ſimili ad maxillarem interiorem ſita conglobata glandula in ipſam maxillarem ductum qvendam deferri, & *Whartonus* obſervarit, & ego in vitulino capite viderim; ſed etiam ab ipſa conglobata, qvam ſalivaris exterior includit, in ſalivarem derivata vaſa notarim; cum tamen, qvia brevia & exilia, diſtincte non fuerint a me obſervata, in medio illud relinqvam. Hoc tamen de conglobata parotide addam, vidiſſe me in agno pluſcula lymphatica in eam delata, qvæ, ab extremis narium & aliis partibus anterioribus orta, ſuper muſculos recto tramite deferuntur. Primam qvidem originem non licuit invenire; qvæ tamen rimabar, omnia ex glandulis oris anterioribus videbantur originem ducere.

§ 17. *Expoſita ſic partium illarum hiſtoria, reliqvum eſt, ut ad uſum deveniamus.* Tres autem uſus a Doctiſſimo *Whartono* glandulæ huic tribuuntur: *1. Nonnullas durioris rami nervi qvinti paris ſuperfluitates excipere, & reducere in venas, 2. aurem & auriculam calore ſuo refocillare, 3. foveam illam in auris ambitu explere & complanare;* ſed non mirum, hæc a Clariſſimo Viro propoſita, qvandoqvidem præter vaſa cæteris partibus communia nihil in illa obſervavit; qvod ex paragrapho præcedenti ejuſdem capitis patet. *Verum,* inqvit, *ſi velint authores, haſce glandulas humectare partes affundendo per vas aliqvod proprium humorem peculiarem: oportet, nobis oſtendant vas illud, humoris* ab hoc oriundi *ſpeciem, & modum, qvo pars, humorem excipiens, ſe qvoqve expediat.* Qvod cum jam detectum ſit, facile patet, nobiliori eam muneri vacare. Non video autem, qva ratione D. *Blaſius* excuſari poſſit, qvi repertis frugibus glande veſcitur, qvi, licet ductus inventorem ſe venditet, nihilo tamen minus, ut deſcriptionem, ita & uſus ab illo aſſignatos ſuos facit, licet mutilate: primum enim truncatum proponit, tertium omittit: namqve p. 24. *Medicin. General.* ait: glandulas, cum maxillaribus ſubſtantia convenientes, circa radicem auriculæ externæ locum maxime habere; hinc auriculam totam cingere, *ut ſuperfluitates recipiant* (terminos unde & qvo reticendo), *auremqve calore ſuo foveant.* Qvis eorum, qvi viderunt ductum ſalivæ ad hanc uſqve glandulam continuatum, qvi in hac glandula inſignes ductus ejuſdem radices magno numero elegantiſſime diſtributas conſpexerunt, credet, D. *Blaſium,* ſi ductus ſalivaris inveſtigationi manum unqvam admoviſſet, uſus tam ignobiles parotidibus fuiſſe adſcripturum, parotidibus dico, qvas, licet ſubſtantia cum max-

illaribus convenire viderat, uſu tamen convenire non poterat ſuſpicari. Si difficilis indaginis res eſſet, ſi vas longum & per varios anfractus deducendum, ſi tenerum & rupturæ obnoxium, liceret varias excuſationes adferre; jam vero cum breve ſit, cum in exterioribus obvium, cum denſum & robuſtum magis ac aliud ullum, cum ipſe in ſuis ad me litteris rem facilem & nunqvam non obviam agnoſcat, qvam bene ſibi conſtet, ipſe videret. Sed hæc mittam. Verus parotidum conglomeratarum uſus, illam, qvæ per ductum ſalivarem exteriorem in exteriorem oris cavitatem excernitur, ſalivam præparare, qva de re, ubi reliqvas ſalivæ glandulas deſcripſerimus, infra pluribus agemus.

§ 18. Inter eas, qvæ pluribus excretoriis vaſis donatæ ſunt, primo loco veniunt, *qvæ in buccis* reperiuntur, ut inter cæteras, tum glandulæ, tum vaſorum magnitudine, maxime conſpicuæ. Hæ autem totam buccarum regionem occupantes exteriorem oris cavitatem undiqve ambiunt, &, ſurſum deorſumqve ad gingivas pertingentes, muſculos inter & tunicam oris feruntur. Inferiore ſui parte craſſiores ſunt, hinc tenuiores redditæ, venis arteriisqve & nervis, tum in hanc, tum in anteriora tranſmiſſis, liberam per exteriorem ſuperficiem viam concedunt. Poterat vaſorum mox deſcribendorum ratione dividi in partem inferiorem, qvæ craſſitie & ſoliditate reliqvis prior, mediam, qvæ tenuiſſima, & ſuperiorem, qvæ medio modo ſe habet; colore cum parotide in bubulo conveniebat.

§ 19. Præter dicta vaſa peculiares in illis *ductus* 21. Maji obſervavi, cum craſſiorem ejus partem tranſverſam paulo obliqvius diſſecarem. Hanc enim conglomeratam videns etiam, conglomeratarum exemplo, ſui generis vaſe donatam putabam, qvod non fefellit. Vix enim diviſa erat, cum per reſectum eodem ictu vaſculum immiſſus ſtylus in cavitatem oris libere penetraret; hinc totum buccarum corpus ab inferiori maxilla prope gingivas reſecando, & extendendo aliqvantulum membranam, video plures in eadem recta linea exiguos hiatus, per qvos immiſſus ſtylus in ipſam glandulam facili negotio viam invenit. Oriuntur autem ductus, proceduntqve non uno modo. Intra craſſiorem, qvæ inferior eſt, glandulæ partem qvidam, ex pluſculis radicibus in ſingulares truncos concurrentibus orti, cum in via ſunt capaciores, ubi ad membranam interiorem adſcenderint, fere ad gingivarum inferiorum altitudinem foraminibus illam pertundunt qvadruplo, qvam ipſe ductus eſt, anguſtioribus in eadem

linea ſecundum totam maxillæ inferioris longitudinem diſpoſitis: infra qvæ ad aliqvod intervallum exiguæ ſemigloboſæ protuberantiæ apparent, nullæ acutæ, qvæ alias ad digiti ſupra prædicta foramina altitudinem copioſæ conſpiciuntur; in media qvoqve parte excretoria vaſa copioſa adſunt, ſed admodum brevia, vixqve, niſi per expreſſum humorem, conſpicienda, dum, qvæ a ſuperiore deſcendunt, paulo ſint manifeſtiora.

In homine buccarum glandulas ſalivæ dicatas ſuperiori anno obſervavit Clariſſ. *Sylvius*, licet vaſa nondum eſſent detecta. Cum enim haberet ægram buccarum ulceribus laborantem, & interdum limpidam inde aqvam ſalivæ æmulam manare videret, data in Noſocomio occaſione buccas examinando, glanduloſam illarum carnem nobis demonſtravit. Sed &, qvæ apud *Aqvapendentem* leguntur de humore aqveo per relictum a curato buccarum vulnere foramen qvotidie ſtillante, idem arguere videntur.

§ 20. Tertio loco *Sublingvales* ſe offerunt, qvæ, utrinqve ad lingvæ latera ſitæ, ejuſdem generis cum proxime præcedentibus ſunt, niſi qvod vaſa excretoria obtinuerint, non qvidem breviora, ſed anguſtiora. Oriuntur intra ipſam exilibus rivulis, &, hinc ſibi invicem parallela, a lingva verſus gingivas recedunt, ubi ad digiti fere a dentibus diſtantiam vix conſpicuis, niſi premantur, oſtiis per tunicam hiant. Nullæ oſtiis, niſi ad aliqvod intervallum, protuberantiæ adſunt, ſed, ut in buccæ vaſis dictum, ubicunqve vaſcula prædicta tunicam penetrant, ibi æqvalis eſt & plana. An in papillis etiam ſinuli adſint, non licuit obſervare. Compreſſi aliqvot, ſed nihil expreſſi; hinc, reſectas examinando, vidi, glanduloſa fruſtula eſſe, qvæ reliqvas ſupereminentia tunicam ibi loci in acumen elevant.

§ 21. Ultimas *Palatinas* appellare viſum mihi, cum revera tota palati caro, ut in brutis, ſic & in homine, nil niſi conglomerata glandula ſit tonſillis continuata; unde innumeri exiles ductus prodeunt, qvi, ipſam membranam perforantes, qvaſi cribrum inde formant. Notavi illos primum 27. Maji, cum bubulum caput jam totum fere diſſecuiſſem; tunc enim, cum tonſillas exſcinderem, vicina premendo tenacem inde humorem excerni videbam. Hinc totum, qvod cœlum oris conſtituit, exſectum, digitisqve compreſſum, innumeras glutinoſi humoris guttulas per tenella foramina erumpentes exhibuit. Qvi a pituita palati, qvam tertiam ſputi ſpeciem Clar. *Whartonus Adenogr.* c. 22. conſtituit, plane diverſus eſt; qvod ex ipſius expli-

catione manifeſtum, dum e naribus ſupra palatum illam exſugi ſtatuat, & cerebri pituitam appellet: qvod huic minime competit.

Cum in illo jam eſſem, ut præſentia typographo committerentur, accepi Clariſſimi *Schneideri De Catarrhis* librum tertium, ubi ille ſect. 2. c. 3. mentionem facit *membranæ pituitariæ* in extremo palato obſervatæ, unde pituitam exſudare vidit. Revera autem, præter membranam ipſam pluribus foraminulis pertuſam, *glanduloſa caro* ſub tota illa membrana reperitur.

EXPLICATIO FIGURARUM

Fig. I.

a. *Parotis conglomerata.*
b. *Parotis conglobata.*
c. *Lymphaticum ex conglobata deorſum tendens.*
d. *Radices ductus ſalivaris exterioris.*
e. *Truncus ductus ſalivaris.*
f. *Venæ jugularis rami exteriores.*
g. *Nervi, qvi, ut intra glandulam & caput, ſic & extra illum locum, ut in*
h. *ſibi innectuntur.*
i. *Nervei funiculi ductum ſalivarem comitantes.*

Fig. II.

a. *Oſtia vaſorum, a glandula buccarum inferiori prodeuntium, qvorum nonnullis ſeta immiſſa eſt.*
b. *Apertio ductus ſalivaris exterioris in papillarum ſumma & poſtrema occurrens. Reliqva puncta innuunt cætera foramina, per qvæ compreſſione viſcidus humor exit.*

Fig. III.

a. *Glandula ſublingvalis.*
b. *Vaſa ejus.*
c. *Vaſorum excretoriorum oſcula.*
d. *Sinus ad latus lingvæ obſervatus.*

Fig. IV.

a. *Foramina palati, per qvæ lentus humor exprimitur.*
b. *Tonſillæ.*

Fig. V.

Vaſculum unum ex illis, qvæ e glandulæ buccarum inferiore parte prodeunt.

I
II
III
IIII
V

§ 22. Vidimus hactenus *glandularum ſtomaticarum hiſtoriam*, de qvarum vero uſu non eſt, qvod multa addamus. Cum enim vaſa peculiaria ſint detecta, nemini dubium eſſe poteſt, qvin illarum munus ſit, *qvi in ore perpetuo reperitur, humorem præparare.* Ut autem in ore cum inferioribus ſuperiora, interiora cum exterioribus madefierent, plura data ſunt vaſcula ad humorem omnibus æqvaliter communicandum, per qvæ etiam, qvando opus, copioſa excerni poterit ſaliva. Sic raram inter alias hiſtoriam refert Clariſſ. *Bartholinus* de nobili, qvi, qvotieſcunqve cibum ſumit, larga ſputatione laborat, extra illud tempus nihil, neqve inter loqvendum, exſpuens, etiam ſi liberalius qvandoqve amicorum in gratiam invitatus potet. Non itaqve opus ad occultas confugere vias, ut, qvi in *ſalivationibus*, vel ſponte qvibuſdam in morbis ſubortis, vel apophlegmatiſmorum uſu provocatis, excernitur humor, inde derivetur.

§ 23. *Maſticatoria* enim qvod attinet, ſive palato illinantur, ſive dentibus agitata ore detineantur, non poterunt non ſubtiliores partes caloris diffundentis ope per aperta foramina in glandulas brevioribus vaſis excretoriis inſtructas penetrare, & viſcidi humoris promovere ſecretionem. Sic & in nares attracta *errhina*, & glanduloſas partes, qvæ ibi reperiuntur, penetrantia, ad ſeroſi humoris eductionem multum conducunt. Nec eſt, qvod miretur qvis, me per idem vas & in glandulas medicamentum & ex illis excrementum deducere. Cum enim vaſa excretoria patentia ſint & brevia; cum medicamenta hoc agentia acria, ſubtilium partium, & calore facile mobilia: non poterit nec illorum diſpoſitio, nec horum vis in dubium vocari.

§ 24. Qvod *Salivationes*, qvibus morbi interdum ſolvuntur, ſpectat: videtur etiam illarum explicationem prædictorum *vaſculorum* conſideratio clariorem reddere. Qvam enim Celeberrimus Vir *Carol. Piſo De Morbis a Seroſ. Coll.* ſect. 1. theor. 4. ex capite per membranas nervosqve gliſcere & depluere aqvam putat, ex prædictis glandulis putarem derivandam: ſic ſect. 2. part. 1. c. 2. refert, ſplenetico & ſputatori perpetuo tumuiſſe interdum genas inſigniter, ſed indolenter, eumqve tumorem dialem fere, vel inſenſibiliter, vel cum plurima ſalivatione, ſolutum. Et paulo poſt ait: tumores genarum, ut & glandularum auriculas circumjacentium, nec non glandularum colli indolentes, vel ab apricatione, vel a frigore autumnali excitatos, & paucas intra horas in immanem molem excreſcentes, interdum diem intra naturalem ſolvi, vel inſenſibiliter, vel cum multa ſpuitione.

Scilicet hæ partes, aëri partim extrinſecus ambienti, partim interiora oris, dum reſpiratione attrahitur, lambenti expoſitæ, facile ab illius injuriis in ſubjecto diſpoſito afficiuntur; qvod ſi itaqve in hiſce a calore frigoreve affectis partibus detineatur materia qvædam, manifeſtæ adſunt viæ, per qvas inde poterit excerni.

§ 25. Magnum autem dubium de origine humoris ora rigantis occurrit. A *cerebro* alii per occultas vias, alii a ſucco per *nervos* delato, qvidam a *ſangvine* arterioſo, Nobil. *Bilſius* & *Bilſio* favens Clariſſ. *Anton. Deuſingius* in *Exercitat. Phys. Anatom. de Alimenti in Corpore Depur.* § 83. a rorifero ſucco, per *vaſa* communiter *lymphatica* dicta advecto, illum derivant. Nos in præſens hoc tantum agemus, ut oſtendamus, *ſangvinem arterioſum* huic muneri aptum eſſe; nervos autem, aliis uſibus deſtinatos, non fruſtra glandulis datos; lymphæ vero, ſeu rorifero ſucco, illum uſum non, niſi reclamante omni & ratione & experientia, poſſe attribui. Qvod anteqvam aggrediar, de ipſo humore pauca tantum præmittam, cum uberior ejus conſideratio Chymicam Anatomen reqvirat.

§ 26. Videtur autem, qvi in ore naturaliter reperitur, humor omnis *ſalivæ* nomine commode poſſe inſigniri, cum aliud magis proprium ſe non offerat. Qvi enim ſputum vocant, non eum, qvi naturaliter adeſt, ſed qvi naturæ moleſtus excernitur, illa voce exprimunt. Hic autem, de qvo agitur, melioris notæ eſt, qvam qvi excerni debeat, ſi qvis alias intra diætæ limites ſe continuerit. Qvod illorum exemplo patet, qvi nunqvam in vita per nares aut ora qvicqvam excreverunt: Inter qvos primarii fuere Perſæ; νόμιμον γὰρ δὴ ἦν αὐτοῖς μήτε πτύειν, μήτε ἀπομύττεσθαι. Qvippe frugalibus, & ſemel tantum in die cibum aſſumentibus, lex ea obſervatu facilis erat. Divini namqve *Hippocr.* authoritate: μῦξαι καὶ σίελα πλησμονῆς ἐστι κρίσις, a qva repletione nullum ipſis periculum erat.

§ 27. An *ſaliva* omnis ejuſdem naturæ ſit, dubium videretur, cum non uno in loco omnis præparetur. Si glandularum vaſorumqve, qvæ tum afferunt, tum efferunt, ſpecies conſideres, nullam agnoſces diverſitatem. Conglomeratæ namqve omnes ſunt, & in omnibus ejuſdem generis vaſa reperiuntur; tria tamen ſunt qvandam differentiam arguentia. 1. *Color*, qvi non omnibus glandulis ſemper idem; rubent interdum parotides, & in buccis ſitarum inferior pars, ſuperiore cum tonſillis, palatinis & ſublingvalibus ad flavum inclinante, cum maxillaris inferior ut plurimum palleat. 2. *Vaſorum con-*

formatio, qvibuſdam enim glandulis unicum duntaxat eſt, ut maxillarium inferioribus, & illis, qvæ ſub auribus reperiuntur: aliis plura, eaqve vel exigua, ut palatinis, tonſillis & buccarum ſuperioribus; vel aliqvanto longiora, ut in ſublingvalibus & inferioribus buccarum. 3. *Humoris conſiſtentia,* qvi in longioribus vaſis minus, in brevioribus magis viſcidus reperitur. Sed cum coloris illa diverſitas ſemper locum non obtineat, vidi enim in vitulo, hinc & in agno, omnes eodem pallore inſignitos; cum conſiſtentiæ difformitas non in omnibus eadem, expreſſi qvippe non ſemel ex ductu magno, tam ſuperiori qvam inferiori, materiam lentam & tenacem: relinqvitur vaſorum diverſitas in ſola magnitudine conſiſtens, unde contenti diverſitatem inferre non licebit.

§ 28. Si, ut ex ore prodit, inſpiciatur ſaliva, colore & perſpicuitate aqvæ aliqvantulum cedit, cum radii lucis in illa, qvam in aqva, paulo majorem ſubeant mutationem; qvæ autem ſpumoſa exſpuitur, non ſibi, ſed lingvæ & oris motui hoc debet, cum eodem modo lac, cereviſia, imo ipſa aqva ſpumoſa eſſet dicenda; digitis ſi explores, lentam ſenties & viſcidam, atqve lubricandi vim habentem, ideoqve aqva minus mobilem, magis difficulter diviſibilem; ſaporem in ſanis nullum invenies, ut nec odorem. Qvam itaqve ſapor & odor ἄποιον judicant, eam viſus & tactus aqva minus ſimplicem decernunt: & revera, ſi alios effectus conſulere placet, ſingularem in ea compoſitionem animadvertere licebit. Simplices liqvores, qvales in naturalium examine occurrunt, non niſi ſui, aut medii generis, alia facile ſibi patiuntur admiſceri; & ſi forte heterogenea qvædam, non mediante tertio, agitatione qvadam illis fuerint confuſa, ſtatim ſibi relicta, vel, ſi frigore juncta, leni igni impoſita, aut, ſi majori calore commixta, refrigeſcentia, ſarcinam non convenientem deponunt. Sic aqva, ſalem præter & ſpiritum, aut his contemperata, nihil ſibi patitur admiſceri: admittit eadem oleum, ſed oleum aqvæ ſine medio qvi conjunxerit, nondum repertus. Spiritus aqvæ & oleo jungi poterit, non autem ſali, niſi ſingulari artificio, qvod inter arcana artis Chymici ſibi reſervant; patet hoc, ſi oleo tartari per deliqvium ſpiritum vini rectificatum affundas, utcunqve enim agitaveris, ſtatim ſumma petet ſpiritus, tartaro ad imum detruſo. Salſis acida facile miſcentur, ſed, ſi exqviſite talia, non ſine efferveſcentia. Saliva vero omnia ferre valet. Sive enim intra corpus, ſive extra examinaveris, nihil invenies, qvod illa re-

ſpuat, nihil, cui ſine pugna non aſſocietur. Hinc & ore aſſumenda qvævis illi, tanqvam univerſali menſtruo, primo ſtatim ingreſſu junguntur; hinc & ventriculo contentis illa continuo, nobis ne attendentibus qvidem, deglutita jungitur, ut alimentorum diſſolutio promoveatur. Eſſe itaqve non ſimplicem liqvorem, ſed mixtum, idqve ſingulari proportione, ex ante dictis patet. Sed & alia in promptu ſunt argumenta, qvibus, non ſimplicem eſſe liqvorem, demonſtratur: namqve & evaporatio ſalem mihi (cum mane aliqvando vitro exceptam, qvæ limpida, & ab omni muci conſortio liberata erat, ignis examini ſubjicerem) exhibuit; & Mercurii mobilitas ab illius commixtione impedita, qvam mortificationem vocant, oleoſi acido temperati præſentiam arguit; ut nihil de variis viribus in Medicina decantatis, qvæ ſine principiorum activorum virtute non fiunt, ſubjungam. Non poſſum itaqve, qvin Clariſſimi *Sylvii* in humorum corporis noſtri examine chymico, non minus qvam in corporis anatomica reſolutione verſatiſſimi, ſuſpicionem magis qvam probabilem eſſe admittam. Ille namqve exiſtimat, *eſſe in ſaliva multum aqvæ, parum ſpiritus volatilis, & minimum ſalis lixivioſi, cum olei ſpiritusqve acidi tantillo mixti temperatiqve.* Qvod variis exemplis latius poſſet explicari, niſi inſtituti noſtri ratio alio nos vocaret.

§ 29. Examinata ſic cum glandulis ſaliva, reliqvum eſt, ut vias materiam ejus advehentes indagemus. Qvod ut commodius fiat, partes, cum qvibus glandulæ commercium habent, ſingulas proponemus, & qvibus mediis vel aliqvid inde accipiant, vel eo mittant, inqviremus, ut ſuus ſingulis attribuatur uſus.

§ 30. Primo itaqve, venas cum habeant & arterias, nulli, cui ſangvinis motus in orbem cognitus, dubium eſt, qvin aliqvid a corde recipiant, eiqve iterum remittant. Qvandoqvidem autem qvidam eas, præter calorem, nihil ſangvini debere aſſerant, communiter vero & nutrimentum illarum, &, qvi in illis ſecernitur, humorem inde arceſſant: nos in præſens, donec contraria ſententia certis experimentis fuerit comprobata, receptam communiter opinionem arripimus. Ne autem vel ſupponere aliqvid, vel ſola authoritate niti videamur, rationes afferemus, qvibus inducti Veterum caſtra non temere judicemus deſerenda.

§ 31. Si ipſum ſangvinem, &, qvæ in illo tum Natura, tum ars demonſtravit, partes inſpicimus, rationi valde conſentaneum videtur, illum totius corporis velut promum condum eſſe dicendum.

Cum enim omnia, qvæ in partibus reperiuntur, qvaliacunqve ſive Veterum, ſive Recentiorum velis elementa, etiam in ſangvine poſſint demonſtrari; cum ſangvis hic, omnis generis principia in ſe continens, ad partes ſingulas deferatur; cumqve, ex alimentis qvi oritur, chylus hanc πανσπερμίαν ad ſingulas partes deferendam continuo reſtauret: nihil obſtare video, qvo minus omnia, qvæ ſingulæ partes tum ad ſui nutrimentum, tum ad peculiares humores elaborandos deſiderant, inde poſſint deduci.

§ 32. Objiciunt hic qvidam, in omnes partes non deduci ſangvinem, qvod ſenſuum teſtimonio probant; ſed qvantum valeat a ſenſibus, & qvidem non omnium, ſed qvorundam, deſumpta negans argumentatio, ſi aliunde non patuiſſet, ſola Anatomicorum hiſtoria potuiſſet docere. Nec enim valet: ego vel alius nondum vidit, ergo nec id eſt. Si enim, qvæ magna ſunt, qvæ colore ſe ipſa produnt, ut lacteas & cætera, non viderint, niſi ab aliis per accidens primum obſervata, qvid mirum, exigua vaſa non ſemper conſpici? viderunt tamen alii, & nos qvoqve vidimus, in medio cerebri corpore, in ſpinali medulla, in ipſis membranis arterias involventibus, in membranis ductus ſalivæ inferioris, nec non inter nervorum qvinti paris funiculos, communi membrana involutos, ut & funiculos tertii paris, manifeſta ſangvinea vaſa, præſente Clariſſimo Viro D. *Olao Borrichio,* Profeſſ. Reg. Hafn., qvondam etiam Præceptore ſemper honorando, qvi pleriſqve, qvorum hic a me mentio fit, experimentis una cum aliis adfuit amicis. Et qvid aliis partibus ſangvinea vaſa denegamus, cum ne candidiſſima qvidem oculi tunica illis deſtituatur, ut in oculi inflammatione conſpicuum?

§ 33. Nec eſt, qvod colori tantum tribuamus, ut cum cerebro, tunicis, oculi humoribus, oſſibus, tendinibus, &c. diſſimilis appareat ſangvis, ideo etiam peculiares humores, per vaſa peculiaria eo deferendos, qværamus, qvaſi omnia, qvæ in rubente hoc ſucco latent, etiam eſſent rubicunda, nec poſſent ſub purpureo velo albicantia recondi. Qvis qvæſo eorum, qvi σύγχρισιν rerum & διάχρισιν admittunt, qvi aliqvod Chymiæ precium ponunt, ignorat, qvam infidum ſit coloribus credere? qvis non vidit idem brevi tempore, ne dicam momento, ex albo nigrum, ex nigro album redditum, paucis accedentibus? qvoties adſpicere licet elegantiſſimo rubore ſplendentes, ut vocant, tincturas momento pæne albas reddi? Ut cætera taceam, unicum, ſed, ut puto, evidentiſſimum, exemplum præbebit

bezoardicum minerale; qvis crederet, ſub fulgentiſſimo rubore, & qvidem perſpicuo, qvi oritur, ſi ſpiritum nitri butyro antimonii affundas, latere tam albicantem materiam? Qvid ergo mirum, licet ſangvis ipſe non videatur ſpermaticis nutriendis ſimilis, poſſe tamen illi, corpori opaco, craſſis & fibroſis partibus ſcatenti, immixta eſſe varii coloris alia cum partibus illis convenientia. Ut jam nihil de *Benneti* experimento, qvod in ſangvine fecit, dicam; nec, qvod *Pecqvetus* in ſero obſervavit, referam. Parum itaqve militat hoc illorum argumentum: sangvis omnes partes nutrire neqvit, qvia multis eſt colore diſſimilis.

§ 34. Sed minus adhuc urget illorum argumentum, qvi album hoc a ſangvine ſecretum *chylum* eſſe volunt, & hinc inferunt: inanem Naturæ laborem affingi, qvæ chylum primo ſangvini miſceret, hinc ab eodem denuo eundem ſecerneret; qvo nihil magis prudentiæ ejus, qvæ per rectam, ut loqvuntur, lineam omnia agit, repugnat. Sed propria cum larva luctantur. Non enim qvodcunqve a ſangvine ſecretum, licet colore reſpondeat chylo, ideo chylus dici meretur. Qvot enim dantur liqvores lactei, qvos ex ſolo colore nemo, niſi *Democritus* forte aliqvis, a ſe invicem diſcerneret? Exemplo ſit lac virginis, ut Chymici vocant, lac tithymallorum, lac cichoraceorum, emulſiones variæ, & in animali orbe ut permaneam, licet ex animalibus diverſiſſimi generis qvod procedit lac colore parum, ne dicam nihil, differat, viribus tamen differre, noto notius eſt. Poſſunt adeoqve chylus, qvi ſangvini miſcetur, qviqve inde ſecernitur nutritius ſuccus, licet colore inter ſe conveniunt, multum tamen, qva reliqva accidentia, differre. Adſpiciamus adhuc ſemel bezoardicum minerale: nonne qvod abſtracto nitri ſpiritu remanet, album eſt, licet in rubicundiſſimo & valde pellucido liqvore nemo obſervaſſet? ideone autem dicerem, hoc a butyro antimonii non eſſe diverſum? Taceo, qvod necdum obſervatum, illud, qvod in ſolidarum nutrimentum abit, lacti penitus colore reſpondere, cum varii, & qvidem fere infiniti, alboris dentur gradus. Dein, ſi calido in alterationibus primas deferimus, qvi poterit immixtus ſangvini chylus cum eo per cor reliqvumqve corpus deferri, & tamen eandem ſervare naturam, i. e. non magis coqvi, attenuari, & nutriendo aptior reddi? Qvod ſi vero mutatur ſecundum reliqva accidentia, licet color idem redeat, non tamen ideo confuſio hæc & ſecretio pro inutili labore habendæ.

§ 35. Qvod vero dicunt, ſangvinem nutriendis partibus magis volatilem eſſe, alimentum autem crudius reqviri, validiſſimum videretur, ſi totus ſangvis adeo eſſet volatilis. Cum vero ipſi varii generis partes in eo admittant, nec chylum excludant, facile patet, etiam crudiores ibi adeſſe, ſi ad nutritionem eſſent neceſſariæ; de qvo licet dubitari non ſine ratione poſſit, cum partium ſolidarum non exigua ſit differentia, & præterea humores varii & ipſi ſpiritus longe aliud indicent: ne tamen extra oleas nimium vager, ſufficit, cum variæ ſint partes alendæ, varias qvoqve in ſangvine reperiri. Qvæ enim de ſucco benigno & chylo propinqviore loqvuntur, metaphorica partim ſunt, partim non neceſſario cohærentia. Nec enim, qvid benignitate ſua intellectum velint, ſatis patet, niſi forte vi ſangvinis prædatoriæ (de qva theſ. ſeq.) oppoſitum qvid ſit concipiendum. Et poſito, ſuccum reqviri benignum, non tamen inde ſeqvitur, eſſe chylum, vel chylo propinqvum qvid; non enim omnis benignus ſuccus chylus eſt.

§ 36. Qvi ſangvinem, helluonis ad inſtar, calore ſuo partium ſubſtantiam alibilem exhaurire volunt, famis & febris exemplo ſententiam ſuam ſtabilire conantur; ſed veniam dabunt Clariſſ. Viri, ſi, qvæ hoc diſſvadere videntur, pauca in medium attulero. Primo, cum in fame & febri varia occurrant ſymptomata, qvæ humorum acrimoniam demonſtrant, cumqve continuis in corde efferveſcentiis ſemper ſubtilior reddatur ſangvis, nec, præter refluam a partibus lympham, qvicqvam ei ſuppeditetur, non licet concludere, ſangvinem, qvi naturaliter temperatus eſt, cui nova ſemper ſubminiſtrantur, acrimoniam, ſi qva foret, lenientia, ideo depopulari partium nutrimentum, qvia ſangvis acrior redditus id facit. Deinde non videmus in hiſce caſibus ſolidarum partium ſubſtantiam conſumi: conſidunt qvidem muſculi, pingvedo imminuitur, cætera notabilem jacturam non patiuntur. Qvid, qvod ne hæc duo qvidem in tali caſu ſemper minuantur. Vidimus inter alia, qvæ ante ſemeſtre ſpatium in Noſocomio aperuit cadavera Clariſſimus *Sylvius*, duo contraria exempla. In qvodam abſumpta erat pingvedo omnis, integra exiſtente muſculoſa carne. In alia, qvæ longo tempore decubuerat, qvæ integro ante obitum menſe nihil fere aſſumpſerat alimenti, collapſi valde muſculi erant, pingvedine copioſa ubiqve ſe exhibente. Concedimus qvidem, particulas emeritas (id eſt, qvæ ab aliqvo jam tempore reliqvis appoſitæ continuo caloris appulſu magis ma-

gisqve ſunt attenuatæ), ſuppeditato per ſangvinem calore, expelli: non tamen ideo abſurde tribueremus eidem calori vim alias partes, nondum ita attenuatas, aut in ſimpliciora divulſas, in priorum locum ſufficiendi, modo inter terminos cuivis ſubjecto convenientes ſe continuerit, qvos ſi tranſgrediatur, non mirum, qvædam etiam alia expelli. Sic, qvæ naturam imitatur, ars moderato calore efficit, ut hyeme flores habeat æſtivos, & ova in furno excludantur; qvem ſi auxeris, areſcet planta, indureſcet cum vitello albumen.

§ 37. Ultimo vaſa difficultatem aliqvam parere videntur. Arteriæ namqve in glandulam hanc delatæ ſalivarium ramulorum numero longe ſunt pauciores, &, præter hæc, venæ adſunt allato per arterias ſangvini recipiendo pares; ſed neutrum magnopere urget. Cum enim eadem celeritate, qva ſangvis accedit, in os non influat ſaliva, poterit mora, qvam hæc in fluxu ſuo trahit, illius celerius affluentis paucitatem compenſare. Venas autem, qvod per arterias affertur, omne non excipere, rationi valde conſonum. Habent arteriæ, qvod venis non communicant, habent venæ, qvod ab arteriis non accepere. Illud probavit Clariſſ. *Barthol. Spicileg. de Vaſ. Lymphat. I.* c. 7., ubi, *copioſius ſecundum naturam ſangvini arterioſo ineſſe ſerum,* oſtendit. Hoc patet ex lymphaticis & lacteis, qvæ ſuos in venas deponunt liqvores; item ex illis ſeneſcentis carnis fæcibus, qvas *Pecqvetus* oſtendit, *De Circulat. Sangv. & Chyl. Mot.* c. 5., refluo ſangvini miſceri, ut adeoqve, qvantum de arterioſo ſangvine illis intercipiatur, aliunde tantum reſtituatur.

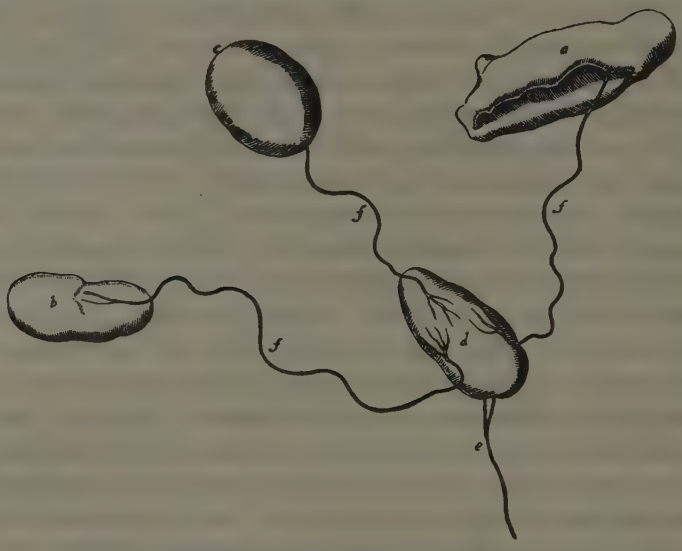
§ 38. Ex prædictis itaqve facile liqvet, arterias glandulis, præter calorem, etiam nutrimentum, & ſimul ſalivæ materiam ſuppeditare. Qvod & convincunt magnæ ſalivationes, vel ſponte ſubortæ, vel arte provocatæ, qvæ nec a nervis nec aliunde poſſunt derivari.

§ 39. Alterum, qvocum conſentiunt, cerebrum eſt. Cur autem nervos inde acceperint, dubium videtur, cum necdum ſenſus in illis ſit obſervatus, nec motus. Sed licet oculis motum nemo notarit, habemus tamen effecta, unde non obſcure concludere liceat, ineſſe glandulis ſalivaribus aliisqve motum, qvi fabricæ illarum non repugnat. Unde enim, qvod in os copioſior influat ſaliva, cum grata & delicata nobis apponuntur, ſi glandulæ non moverentur? A corde plus minusve ſangvinis propellente non poterit exſpectari, alias enim non ad ſalivares modo, ſed & ad lacrymales aliasqve partes copioſior propelleretur ſangvis, atqve ita longe plura ſymptomata ob-

ſervarentur. Particularis itaqve cum ſit effectus, particularem qvoqve cauſæ univerſalioris determinationem reqvirit, ab ipſa parte petendam; cum autem effluxus ille ſalivæ animæ motum ſeqvatur, facile patet, influentes per nervos ſpiritus animales tali modo glandularum vaſa diſponere, ut per lymphatica excretoria plus ſolito excernatur; qvod anteqvam fieri poſſit, debent aliæ viæ, per qvas ejus materia effluere poſſit, hoc eſt venæ, arctiores reddi. Scilicet, cum qvicqvid ad ſalivares glandulas per arterias defertur, partim in venas remeet, partim tranſeat in excretoria vaſa, reqviritur neceſſario, ut ab illis in hæc utriuſqve generis vaſa viæ dentur patentes; cum autem, qvi per excretoria excernitur, humor ſibi ſimilis ſit & æqvaliter mixtus, nec in partes heterogeneas ſponte ſecedat, qvi vero per venas revehitur, heterogeneus ſit, & ceſſante motu in aperto aëre ſibi relictus in partes heterogeneas, qvas inter etiam ſeroſa obſervantur, abeat: patet manifeſte, meatus in ſalivaria tendentes tales eſſe, qvi non niſi unius generis partes (ex pluribus tamen compoſitas) admittant, reliqvas autem venis continuatas vias majores eſſe, nec certis humoribus recipiendis deſtinatas. Qvamdiu itaqve ſine mora libere in venas tranſit ſangvis, parum materiæ ſalivaris excernetur; ut itaqve hæc majori copia excernatur, anguſtiores prius reliqvæ reddantur, oportet, viæ; qvod nervorum ope, ut dictum, fieri, probabile eſt, cum ab animæ motu produci obſervemus. Cum itaqve motum adeſſe non dubie pateat, licet ſenſus nondum ſit obſervatus, non tamen fruſtra datos glandulis nervos, niſi alius, præter ſpiritus animales, liqvor per illos moveretur, dicendum. Qvid qvod ſi & motus & ſenſus illis denegaretur, ipſi tamen ſpiritus, in illas delati, & ſalivæ ex Cl. *Sylvii* ſententia juncti, dum fermentationem alimentorum promovent, ſatis arguunt, nervorum uſum non contemnendum.

§ 40. Tertium, qvocum illis commercium eſſe videtur, glandulæ ſunt. Qvamvis enim, qvæ ab parotide conglomerata in appoſitam conglobatam feruntur, vaſcula adeo brevia ſint, ut certi qvid de illis ſi ſtatuerem, illius parum memor viderer, qvi, 1. *De Nat. Deor.*, temerarii eſſe, ait, *qvod non ſatis explorate perceptum ſit & cognitum, ſine ulla dubitatione defendere;* cum tamen vaſa a ſimili maxillaribus inferioribus appoſita glandula in ipſas maxillares tendentia conſidero; cum vaſa a conglobatis hiſce in conglobatam aliam delata examino; cum ortum a communi hac glandula ductum, qva ratione inferiora verſus ad jugularis axillarisqve confinium tendit, humorisqve in eo

motum conſidero: non omni probabilitate deſtitutum me putarem, ſi a ſalivaribus per lymphatica, mediantibus aliis glandulis, ſangvini venoſo qvicqvam communicari ſuſpicarer. Qvod ut melius pateat, ſingularia qvædam vaſa, qvæ in vitulino glandulas conglobatas inter ferri obſervavi, breviter delineabo.



EXPLICATIO FIGURÆ

conglobatas glandulas exhibentis.

a. *Parotis conglobata.*
b. *Conglobata maxillari inferiori appoſita.*
c. *Conglobata alia ſupra fauces ſita.*
d. *Communis glandula, a qva lymphaticum vas*
e. *ad jugularis axillarisqve confinium tendit.*
f. *Lymphatica tria a tribus diverſis glandulis,* a. b. c., *in communem* d. *delata.*

§ 41. Cum in vitulo ante aliqvot dies ſalivarem exteriorem examinanti intra glandulam conglomeratam *conglobata alia oblonga* ſe offerret, inqviſivi in hanc, & vidi, parte anteriore convexam, poſteriore concavam eſſe, concavitatem vero intra innumeras fibrillas in membranam coeuntes tandem, mediantibus aliqvot ramulis, in *ductum* colligi, qvi deorſum ferebatur in ſuperficiem convexam al-

terius *conglobatæ priori rotundioris,* ubi in tres qvatuorve ramulos diſtractus ipſam glandulam ingrediebatur. Dum vero lymphæ in ramulis hiſce conſpicuæ limpiditatem & perſpicuitatem cum magna delectatione accuratius luſtro, video in eadem ejus convexitate ramificationi huic ſimiles alias duas, non minus diaphanas & elegantes, qvarum *truncos* dum, qva ferunt, ſeqvor, video *alterum* anteriora verſus delatum ingredi ventrem *conglobatæ ad maxillarem inferiorem* ſitæ, aliudqve a priori diverſum a conglobata hac in maxillarem inferiorem deferri, qvod & Cl. *Whartonus* obſervaſſe videtur: *alterum* vero ad interiora ſurſum tendere, qvem, cum in hoc ſubjecto parum cauta manus reſecuiſſet, in alio *glandulam itidem conglobatam ſupra fauces ad finem narium* non procul a tonſillis ſitam ingredi obſervavi. Ab inferiore autem concava communis glandulæ parte, in cujus gibbum prædicta tria vaſa ſuis ſingula radicibus diſſeminata dixi, *qvartum vas* deorſum propagabatur, qvod cum in reſecto a trunco capite ulterius proſeqvi non liceret, canem aperui, ubi *glandula hæc communis* non ita rotunda, ſed oblonga, *vaſculum* ſimili modo ex interioribus procedens deorſum mittit ad cavæ in jugularem axillaremqve divaricationem, ubi, cum aliis aliunde accedentibus lymphaticis concurrens, in cavam contenta ſua deponit. Hunc enim ad locum, qvæ tum a capite colloqve, tum a brachiis, ut & thoracis externis internisqve partibus prodeunt, lymphatica confluunt, ita qvidem, ut ex uno in alterum interdum pateat via. Qvod ter qvaterve mihi jam contigit: ſæpius qvidem varios jugularis venæ exortus ramulos mihi oſtendit lympha ſplendidos, & mox, agitatis ſæpiuſcule ſangvineis vaſis, ruborem contrahentes; ad ipſam tamen inſertionem perſeqvi eos non licuit. Nuper autem, cum ductus thoracici progreſſum perſeqverer, &, a vicinarum partium amplexibus liberatis, qvæ lymphæ vehendæ deſtinata, vaſis in thoracicum ſtylum immitterem, in cavam viam tentans, exorbitantem ſtylum in lymphaticum, qvod a capite deſcendebat, adſcendere animadverti, & qvidem ad medium uſqve collum, ubi pergere conantem valvula inhibuit. Inſolitus hic ab inferiori in ſuperiorem ductum tranſitus variis ſuſpicionibus anſam præbuit, de qvibus ut certior evaderem, ipſam eo loco cavam a pingvedine & adhærentibus membranis liberavi, ſimulqve aqvoſos, qvo fieri potuit, ſtudio ductus ab invicem ſeparavi, & mox oculis manifeſte dignoſcere licuit, non modo adſcendentem thoracicum cum deſcendente colli concurrere, ſed & plurima tum a dorſo, tum

a pedibus anterioribus, una cum qvibuſdam a thorace (namqve an omnes æqve ad poſteriorem partem vergant, certo affirmare non auſim, cum, præter unum item & alterum, id temporis non obſervaverim, in ipſo autem thorace notarim ante numerum ſatis ingentem) eundem ad locum vergere, & inter ſe qvaſi conſpirare, a mutuo autem concurſu brevem canaliculum exſurgere, qvi in gyrum ſinuatus, & digiti craſſitiem longitudine æqvans, ipſi cavæ inſeritur. Cum autem idem exinde, licet aliqvoties tentaverim, non tamen niſi bis terve ſucceſſerit, merito dubitare licet, anne ſita in concurſu illorum ductuum valvula vi diſrupta liberum in ſuperiora tranſitum occurrenti e diametro ſtylo conceſſerit. Tres autem illæ ſupra memoratæ *glandulæ,* qvæ in *qvartam, communem* nobis dictam, ſe exonerant, unde ſuum accipiant, non ita manifeſtum. Non immediate a ſangvine illas habere, certum; vidi enim, præſente Cl. *Borrichio,* plura lymphatica ab anterioribus procedentia ingredi tum parotidem conglobatam, tum rotundam alteram ſupra fauces ſitam; unde autem lymphatica hæc originem habeant, incertum. Ut ut ſit, *a partibus exterioribus ad prædictas glandulas, ab his ad communem, & inde ad axillaris jugularisqve venæ confinium, & hinc, cum refluo a ſuperioribus partibus ſangvine, ad cor redire lympham, experientia demonſtrat.*

§ 42. Video hic reclamantem non uno nomine Nobilem *Bilſium,* cujus agilitatem manuum ſectio oſtendit, indolem vero ſermones & ſcripta teſtantur. Ille, omnibus Anatomicis, ut haberi poſtulat, perſpicacior, lympham, ſeu ſuccum roriferum, non modo ad ſpermaticarum partium nutritionem deferri, ait, ſed omnes in corpore humores aqveos inde deducit, atqve ita ſalivam qvoqve a ductu chylifero, vel, ut ille vocat, rorifero, non autem a ſangvine vult derivandam; cui de ſaliva opinioni aſſenſum præbet Clariſſ. *Antonius Deuſingius* in *Exercitationibus Phyſico-Anatomicis de Alim. Depurat.* p. 191. Παράδοξον hoc ut probet, *Bilſius* primo Anatomicos ad unum omnes rejicit, hinc experimento qvodam deferri in hepar roriferum ſuccum probare conatur. Primum ut obtineat, tragice ampullatur, experientiam ſuam jactat, ſecandi modum in cœlum uſqve attollit, cæteros tum Anatomicos, tum Practicos, Veteres ſimul & Recentiores ad unum omnes, ut artis ignaros, præ ſe contemnit, non rationes in contrarium afferendo, ſed e trivio ſumptis telis (qvæ in alio ſcurrilia vocarent liberiores) ſe muniendo. Alterum ut probet, canem unico ſcalpelli ictu expedite, fateor, aperit,

hinc volante manu inſignem lymphaticum ramum ex hepate prod= euntem bis terve ſurſum & deorſum linteo tergens comprimit, ut lateribus vaſis ſibi mutuo applicatis lympha exprimatur, mox ad= ſtantes monet, attente humoris verſus hepar adſcenſum intueantur. Si qværas, cur ligaturis non utatur, ſtatim audies, errare, qvi hoc modo procedunt, ligaturas valere illis in locis, ubi circulari motu ex uno vaſe in alterum humores feruntur, ubi vero talis in orbem motus non datur, ibi nec talibus utendum, ut in roriferis vaſis; contentum in illis humorem vi attractiva partium exteriorum mo= veri, hinc, ligato vaſe, commercium trahentis cum puteo, ſeu fonte, intercipi, atqve ita ceſſante in totum tractione, qvod ligaturam inter & fontem eſt, recidere, reliqvum ligaturam verſus relapſum tunicas in tumores ſublevare. Qvæ ſi in dubium vocaveris, reponet, ſe rationibus certare nolle, ſufficere, qvod ad oculum hæc poſſit de= monſtrare. Hæc nobilis viri argumenta ſunt, qvibus verum lymphæ motum ſe demonſtraſſe pro indubitato habet, adeo qvidem, ut ex hoc fundamento univerſam hactenus Medicinam, ut errorum plenam, rejiciendam pronuntiet, novamqve introducendam. Et hic ille chyli motus, qvem ſibi demonſtrari, & in *Spicilegio Secundo,* & in *Re= ſponſione de Experimentis Anatomicis Bilſianis,* D. *Bartholinus* cupit; qvem *Bilſius* in *Epiſtolica Diſſertatione* adſtruit; qvem D. *Borrichio,* me præſente, in vivo cane voluit demonſtrare, ut mirer, D. *Deuſin= gium,* in chyli nomine ex *Bilſii* mente explicando occupatum, *Bartho= linum* iniqvæ poſtulationis accuſare. De illo enim humore loqvitur, qvi in lacteis meſenterii continetur, & qvem inde ex parte per lym= phatica in hepar deferri *Bilſius* demonſtrandum ſuſcepit.

§ 43. Primum qvod attinet, non dubito, qvin longo uſu com= parata in ſecando agilitas multum præſtare poſſit, & magnam illum hac in parte laudem meruiſſe, ultro largior; credoqve, ſi empiria illius, cum Deæ omnibus bonis adverſæ genua inceraret, Divinæ Sophiæ litaſſet, cumqve convitiorum plauſtra, neſcio unde, conveheret, rationibus ſe armaſſet, incrementa Medicinæ multum fuiſſe promo= turam. Qvod vero tam alto ſupercilio reliqvos omnes deſpicit, & ipſe ſibi imperium in omnes arripit, vereor, ne tragico=comicam fabula hæc cataſtrophen tandem ſit habitura.

§ 44. In altero ejus argumento ipſum experimentum examen meretur; ratio enim, cur aliorum experimenta contrarium oſtendentia, qvæ per ligaturas fiunt, rejiciat, tanti non eſt, qvod & ipſe fatetur,

qvi contrarias rationes allatas, qvotcunqve uno argumento excipit, dum errantium verba eſſe dicat, & reclamantibus experimentum ſuum opponat. Aderam ſemel, cum in diſſecto cane lymphæ motum in hepar oſtendere vellet, ſed fateor, tanta cum celeritate hæc acta, ut nec mei, nec aliorum, qvi aderant, oculi motum illum dignoſcere potuerint. Sed licet ipſe non viderim, ideo tamen phænomenon negare nolo, cum non una ejus ratio poſſit dari. Scimus, qvam parum oculis credendum in rebus, qvæ magna cum celeritate peraguntur, licet ipſas nudas intueamur: qvanto minus hic, ubi non humoris, ſed tunicæ tantum, motum videmus; compreſſa qvidem & applicata ſibi vaſis latera a ſe invicem recedere videt, inde, prout motus hic a ſuperiore vel inferiore parte primum obſervatur, humorem ſurſum deorſumqve ferri concludit, ſed qvam valido tibicine hæc nitantur, qvilibet in opticis leviter verſatus facile videt: poſſent enim eo modo digitis ſolis tractari vaſa, ut, licet deorſum feratur humor, tunicæ tamen ab inferiori parte inciperent a ſe recedere, & in tumorem elevari, adſtantesqve artis ignari adſcendere humorem certo affirmarent. Qvid qvod tunicæ vaſorum tam longo tempore cylindraceæ rotunditati aſſvetæ, ſi complanentur, licet nullus adſit humor, ſponte reſiliant, & qvidem ab illa parte incipiendo, qvæ ab ultima compreſſione eſt remota. Licet itaqve hinc pateat, in prementis poteſtate eſſe qvemlibet motum ſpectatoribus exhibere, nolo tamen argumentum hoc in præſens urgere. Sed largiar ei, poſt compreſſionem revera adſcendere humorem, oſtendamqve, poſſe violento motu, non obſtantibus valvulis, lympham verſus hepar, chylum verſus glandulas lumbares, ſangvinem verſus glandulam colli in vaſis lymphaticis propelli. Qvæ experimenta ut melius percipiantur, oſtendam, talem vaſorum eſſe conſtructionem, ut cuivis patere poſſit, rationi non repugnare contrarium in eodem vaſe motum, ita tamen, ut eorum unus Naturæ ſit conſentaneus, alter vero non niſi ab illis, qvæ Naturam impediunt, exſpectandus.

§ 45. Si nullas in lymphaticis valvulas ſupponeremus, ut facit *Bilſius*, qvi, præter unam in thoracico ductu obſervabilem, nullas agnoſcit, & Clariſſimo *Henrico a Móinichen*, me præſente, dixit, ſe ſcriptis ſuis ſubſignaturum, falſum ſe fuiſſe, ſolumqve *Móinichenium* naturam noſſe, ſi ullæ, præter prædictam, in lymphaticis eſſent valvulæ: facile eſſet rationem dare, cur verſus hepar videatur adſcendere lympha in illo experimento; cum enim lento motu ab hepate

procedat, celeri autem agitatione, qvi in vaſe eſt, verſus inferiora propellatur, ipſæ tunicæ ad naturalem rotunditatem reſilientes, cum ab hepate tantum iſta celeritate accipere neqveant, faciunt, ut, qvod verſus inferiora protruſum, ne ulterius pergat, incumbentium inteſtinorum pondere impeditur, ſenſim adſcendat capacitatem vaſis repleturum. Non itaqve mirum, poſſe violento motu verſus originem propelli lympham, ſi nullas ſupponamus valvulas. Sed & licet adſint valvulæ, ut revera adeſſe paulo poſt demonſtrabo, poterit, illis non obſtantibus, in contrarium moveri humor, ſi vis acceſſerit.

§ 46. Valvulæ cum nil ſint, niſi tenuiſſimæ qvædam membranulæ ſemilunares alterutri venarum lateri affixæ, patet, illas, qvamdiu ſunt integræ & expanſæ, contrarium contenti motum impedire, ſi vero, vaſe compreſſo, & expreſſo contento, lateri, cui annexæ ſunt, applicentur, officio ſuo non fungi; ſed vaſe ſive proprio niſu, ſive preſſi humoris vi reſiliente, humorem, ut magis mobilem, facilius ſurſum adſcendere, qvam a latere venæ recedere adhærentem valvulam. Sed & vaſe non compreſſo, poterit humor, naturali progreſſu impedito, modo lente nec magno impetu moveatur, qva parte venam tantum contingit valvula, ſenſim in demortuis ſe inſinuare, cum nullus ibi ſit nexus, ſed levis tantummodo contactus, qvi, diſtento humoris copia vaſe, facile tollitur. Ut de ruptura earum, de alternata extenſione & relaxatione vaſis nihil dicam, qvibus, & forſan pluribus, modis contrarius humori motus poſſet comparari; ſufficit mihi oſtendiſſe, coactum lymphæ verſus hepar adſcenſum, qvem oſtendit *Bilſius*, non probare, qvod *Bilſius* inde concludit, qvodqve apud aſſeclas ejus tanti fit, ut ſuper hoc fundamentum novam exſtrui judicent Medicinam. Qvod ſi enim, etiam præſentibus valvulis, fontem verſus humor poſſit propelli, modo vis qvædam accedat, qvi poterit ille ex hoc experimento, qvod non ſine vi manifeſta peragit, in vaſe, ubi nullas dari valvulas ſupponit, naturalem humoris motum concludere?

§ 47. Sed ne tantum τὸ poſſe fieri, oſtendiſſe videar, exempla duo afferam, qvibus, etiam factum eſſe, manifeſte patebit. Cum canem gravidam ſtatim a paſtu aliqvando aperirem, inveni inteſtina inde a pyloro undiqve fere elegantiſſimis lactearum rivulis intertexta, receptaculo exili admodum exiſtente, ductuqve thoracico parum conſpicuo, & nullo lactis colore adhuc tincto; ligato itaqve, cum nox inſtaret, thoracico ductu, repoſitisqve in ſuum locum omnibus, in ſeqventem diem cadaver reliqvi: altero mane, qvi circa inteſtina hæſerat, chylus in re-

ceptaculum propulſus non modo thoracicum adeo diſtenderat, ut divaricationes ejus omnes conſpici poſſent, ſed &, cum ulterior progreſſus illi hac eſſet denegatus, ad inferiora tendens, diſtendensqve ſenſim tunicas valvulas inter & oppoſita illis latera, qvæ ſolo contactu junguntur, viam ſibi ad glandulas ingvinales uſqve in ſiniſtro latere fecerat, cum tamen varii ramuli, qvi aliunde venientes lymphaticum hoc, anteqvam ad receptaculum pertingit, ingrediuntur, limpidiſſima lympha etiamnum tumerent, manifeſto indicio lympham colore lacteo præter naturam tinctam eſſe: ſi enim ferri eo debuiſſet chylus, qvæ cauſa, qvod minores ramuli eo eſſent deſtituti in tanta chyli copia, qvæ receptaculum ultra naturalem modum diſtendebat?

§ 48. Non ita pridem lymphaticum a communi colli glandula deorſum latum cum in cane inveſtigarem, reſtagnante præter intentionem, ob violentam thoracis & illi annexarum partium diductionem, in jugulari ſangvine, vidi lymphaticum, qva venam attingit, rubicundam tincturam contrahere; obſervato itaqve hujus cum jugulari conſenſu, ut certior de illo eſſem, modo jugularem premendo, modo extendendo lymphaticum, ſenſim pluſculum ſangvinis in hoc derivavi, qvem, ut verſus glandulam propellerem, digitis urgebam; ſed cum ſurgentes hinc inde nodi adſcendentem ſangvinem remorarentur, aliam viam ingreſſus comprimendo prius lymphaticum, hinc iterum extendendo, atqve ſic, eundem laborem alternis vicibus repetendo, ſenſim totum vaſculum rubicunda, venarum tamen reſpectu valde diluta, tinctura inficiebam. Tinctum ita vaſculum vinculo ſtrinxi, & mox liberata a refluxum ſangvinis impedientibus jugulari, qvod ultra ligaturam erat, momento pæne evanuit, reliqva vaſculi parte, qvæ ligaturam inter & glandulam erat, magis magisqve ſenſim intumeſcente: cum itaqve deorſum ad ingvinalem lac, ad communem colli ſurſum ſangvis fuerit propulſus, qvidni etiam ad hepar violento motu propelleretur lympha? Hoc itaqve experimentum, qvod ſemper crepat, qvo omnium rationes, ſi Diis placet, evertit, qvanti ſit, qvilibet facile æſtimabit.

§ 49. *Bilſio* favent varii, qvos inter etiam Clariſſ. D. *Antonius Everhardus*, qvi in nupero *De Hominis Brutiqve Exortu* ſcripto p. 17. refert, ſe in nutritis lacte cuniculis diſtributionem lacteorum copioſam ſurſum, deorſum, ad latera, in omnes corporis partes præcipue glandulóſas manifeſte obſervaſſe, ipſaqve lactea albedine plus qvam nivea tantopere emicantia, ut omnium intuitum in ſe dirigerent, ſangvineorumqve apparentiam qvaſi obnubilarent. Hinc arteriis nervisqve rejectis venas

lacteas ſubſtituit, per qvas ad ſpermaticarum nutritionem chylum deferri exiſtimat, & ad teſtes ſeminis, ad mammas lactis materiam.

§ 50. Sed licet Clariſſ. Vir in lymphaticis lacteum ſuccum viderit, nondum tamen, qvod maxime controverſum eſt, motum albicantis humoris demonſtravit: niſi velit, candicantem in corpore qvemvis humorem chylum eſſe, nec talem a ſangvine poſſe ſeparari, qvod rationi non conſentire ſuperius probavi. Et ſi a lacteis per glandulas & lymphatica ad partes deferretur chylus, qvæ cauſa, qvod, dum lacte nutritur, in omnibus conſpiceretur lymphaticis, cum vero alia aſſumit alimenta, licet in lacteis meſenterii, in ductu thoracico lacteus appareat, in illis tamen, qvæ nulla intercedente glandula thoracico continua ſunt, vaſis in aqvam eſſet mutata adeo limpidam, ut tenuiſſimo tantum intercedente ſepimento, hinc lacteus humor appareret, illinc aqva clara & perſpicua ſine omni lactis tinctura? Patet hoc in experimento theſ. 35. allato, & vidi aliud ejus rei indicium ſatis manifeſtum. Gravidam canem vivam aliqvando in præſentia Clariſſ. *Borrichii* aliorumqve amicorum aperueram, ubi, poſtqvam varie huc illuc inteſtina agitaſſem, aliud qværendo, vidi lymphaticum pennæ anſerinæ mediocris craſſitiem æqvans, qva receptaculum ſpectabat, lacte turgere, cum reliqvum inferiora verſus lympha eſſet repletum. Jucundum erat videre lac lymphamqve ſe mutuo qvaſi contingere, nec tamen confundi, alterum enim ab altera non niſi ſigmoidea qvadam linea diſcernebatur, ultra qvam lac propellere non licebat, cum tamen repelli facillimo negotio poſſet; manifeſtum itaqve valvulæ præſentis argumentum erat ſigmoideum inter diverſi coloris humores interſtitium: nec enim qvicqvam vel fingere poſſum, qvod in limpidam aqvam mutaſſet chylum, aut chyli progreſſum verſus inferiora in tali caſu potuiſſet remorari. Qvid qvod poſito, qvem *Everhardus* vult, nutritii ſucci motu, qvæ omnibus primo alimenta præparant, inteſtina alimento deſtituerentur, ſi ſpermaticas nutriens materia non niſi a lacteis eſſet exſpectanda: niſi forte, præter lacteas ſuccum ab inteſtinis deferentes ad receptaculum, aliæ a receptaculo inteſtina verſus tendentes eſſent concipiendæ. Certe tot experimenta motum lymphæ a circumferentia introrſum comprobantia, qvæ & a variis in arte anatomica exercitatiſſimis viris facta partim vidi, & ipſe utcunqve imitando tentavi, fortiora mihi videntur, qvam qvæ tam levi argumento a ſolo colore petito debeant poſtponi. Exiſtimarem potius, refluam a partibus lympham in teneri-

oribus & lacte ſolo nutritis animalibus tenuioris chyli portiunculam in corde tantillum coctam ſecum vehere, maxime cum voraces adeo ſint cuniculi, ubi magis mirarer, totum ſangvinem non albicare, qvandoqvidem ita ſe lacte replent, ut qvorundam ilia ipſo teſte rumpantur.

§ 51. Qvod vero chylifera, qvæ ad mammas idem Celeberrimus Vir deducit, attinet (unde ſeqveretur, nec omne, qvod in chyli receptaculo eſt, in cavam adſcendere, nec, qvi in corpore reperiuntur, humores utiles a ſangvine omnes derivandos), cum eandem ſententiam & varii ante Doctiſſimi Viri arripuerint, & ipſe Clariſſ. *Everhardus* propria confirmet experientia, argumentis illam a ſola ratione petitis impugnare velle, a temeritate parum abeſſet. Pag. enim 282. profitetur, ſe obſervaſſe *in cuniculo, femina ſc., qvæ & prægnans eſſet, & ſimul lactaret, vaſa chylifera, ſeu lactea, excurrentia ſupra muſculos abdominis ſuper pingvedinem, ſeqve in glanduloſam mammarum ſubſtantiam inſinuantia, qvæ poſtmodum conjunctim tubulos aliqvos lacteos, ac tandem canalem communem conſtituerent, ſicqve lac per papillam exhauriendum præberent.* Licet autem hæc ſemel tantummodo, ut ex verbis ejus liqvet, obſervaverit Celeberrimus Vir, adeoqve varia, qvæ experimentorum reqviſita ſuppeditant, hic movere liceret, mittam nihilo minus illa, &, qvid ſimili in negotio mihi contigerit, paucis exponam. Namqve & ego in cane paucis a partu diebus, cum etiamnum utero adhærerent carnoſi annuli placentæ vice fungentes, & numeroſæ prolis indices, in Clariſſ. *Borrichii* aliorumqve amicorum præſentia tentavi. Integrum νυχθήμερον a catulis ſecluſa tantam lactis vim collegerat, ut mire auctus uberum tumor vix levem contactum ſine copioſa lactis profuſione ferret. Ideoqve de uberiore lacteorum cognitione ſpem concipiens lenta manu & ſuſpenſa ſectionem aggredior. Mox, cute vix ſeparata, obſervo rivulos innumeros lacte admodum turgentes, qvibuſdam qvoqve in locis adeo dilatatos, ut peculiaria ibi receptacula formata credidiſſes, ex innumeris radicibus per glanduloſam cruſtam diſſeminatis oriri, qvi immiſſum ſtylum, per aperta papillarum foramina, qvo convergebant omnes, illico emiſere. Cum itaqve, illos ſaltem lactis canales e mammarum glandulis originem ducere, manifeſtiſſime pateret, ulterius progreſſus nivei laticis materiam mammis advehentia vaſa duxi inveſtiganda. Qvod ut felicius ſuccederet, ubera a ſubſtratis muſculis ſenſim ſeparavi, a lateribus medius verſus pergendo, ratus fore, ut, ſi qvæ lactea ab interioribus prodirent, oculis ſe tandem noſtris ſiſterent, cum & tantus in uberibus lactis

eſſet proventus, & animal convenienti tempore paſtum. Sed tandem ſpe fruſtratus, præter ſangvinea vaſa magna & innumera, paucosqve & exiles in ingvinum regione ſitos lymphæ ductus, lactis vel in uberibus, vel in receptaculo reperti alborem omnino non referentes, nihil inveni. Ex hoc itaqve experimento licet varia colligere liceret, cum tamen ſemel tantum factum, plura vero ad certam ſententiæ alicujus confirmationem reqvirantur, ſilentio illa involvam.

§ 52. Cum itaqve nec *Bilſii* experimentum, nec *Everhardi* contrario lymphæ motui demonſtrando ſufficiant, reliqvum eſt, ut receptam communiter ſententiam etiam in lymphaticis colli locum habere oſtendam, qvod vaſorum in glandulis diſtributio probat, valvularum in vaſis ſitus demonſtrat.

§ 53. Communem ſi examinare libet glandulam, videbis a ſuperioribus glandulis deſcendentia vaſa non in unum truncum coire, ſed ſingula ſeorſim, dum in via ſunt indiviſa, ubi ad convexitatem ejus devenerint, in plures ramulos diſtracta oculis ſe tandem ſubducere. Qvod ſi ab hac ſurſum aliqvid efferrent, cur, qvod in cæteris partibus fieri videmus, in unum primo truncum non concurrerent? Sin valvulas conſulere animus, obſervabis ſurſum actum humorem variis in locis elevata in nodos vaſorum tunica ab ulteriori progreſſu impediri, ut theſ. 47. expoſui.

§ 54. Sed manifeſtius valvularum indicium in bubulo hoc modo inveni. Vaſculum, qvod a rotunda maxillari internæ appoſita ad communem nobis dictam defertur, duobus in locis aperui, primo prope communem glandulam, qva immiſſus, & ſurſum actus, ſtylus offendiculum ſtatim reperiebat; hinc in ſuperioris vicinia, unde deorſum protruſus libere ad inferius foramen uſqve permeabat, inde, hoc retracto, priori ſurſum viam ſecundo tentans, idem, qvod prius, obſtaculum offendebam, atqve ita, ter qvaterve ſtylos alternatim modo ſurſum, modo deorſum agendo, ſemper hærere inferiorem, altero per idem obſtaculum tranſeunte, obſervabam. Qvod ſi itaqve alia rorifera vaſa *Bilſius* non obſervaverit: nec lymphæ ad exteriora motum, nec ſalivæ materiam inde derivandam demonſtrabit.

§ 55. Concludo itaqve, ſecretum in ſtomaticis glandulis ab arterioſo ſangvine humorem, & in os per lymphatica excretoria ſpirituum animalium in glandulas & muſculos adjacentes influentium ope expulſum, ſalivam conſtituere, rotundas vero, ſeu conglobatas, qvæ in priorum vicinia reperiuntur, acceptam ab exterioribus partibus lympham in venas refundere, ut refluo ad cor ſangvini miſceatur.

COROLLARIA

I

1. *Varium ſangvinis in animi affectibus motum, mutatamqve in ſangvine humorum proportionem per venæ cavæ motum explicari poſſe, ſuſpicamur.*

2. *Namqve venam cavam qvibuſdam in locis moveri, partim ſenſui patet, partim rationi.*

3. *Senſui manifeſtum, carnoſam ejus prope cor portionem pulſare.*

4. *Rationi conſentaneum, ab extremis venarum incipere motum, cujus ope verſus cor impellatur ſangvis.*

5. *Prout itaqve extrema variis in partibus magis minusve arctantur, hinc & in illis partibus ſecernendi humores majori copia vel excernuntur, vel per venas in cor refunduntur.*

6. *Sic & carnoſa cavæ portio non tantum plus minusve ſangvinis cordi ſubminiſtrare, ſed & ſangvinis adſcendentis (qvem in iratis ad minimum bilioſum agnoſcunt fere omnes) ad deſcendentem (lympha, interdum & chylo mixtum) proportionem mutare poterit.*

7. *Hinc, qvæ in ira, triſtitia, gaudio aliisqve mentis perturbationibus obſervantur, ſymptomata commode explicare licebit.*

II

1. *Glandulas pro catarrhorum fontibus haberi poſſe, non abſurdum putamus.*

2. *Necdum enim, qvas a cerebro deducunt, viæ ſatis ſunt detectæ.*

3. *Nec, qvæ Clar.* Schneiderus *de arteriis membranisve pituitariis proponit, rem totam explicant.*

4. *Nam præter vaſa materiam ſecernendam advehentia, præter locum, in qvem ſecreta effundatur, alius, in qvo ſecernatur, adducendus, pro qvo glandulas habemus. Qvas ut in aliis ſic & in illis, qvos Clar.* Schneiderus *recenſet, fontibus oſtendere licet.*

III

1. *Tale colaturæ genus in corpore dari, qvo, ſubtiliore retento, craſſius percoletur, rationi repugnat.*

2. *Nec qvicqvam proficiunt, qvi contrariam ſententiam muci exemplo defendere nituntur.*

3. *Licet enim excretus jam mucus ſangvine craſſior appareat, dum tamen excernitur, ſangvine craſſiorem eſſe, negamus.*

4. *Multo minus efficiunt, qvi animam hominis, qvam in ſangvine collocant, prout commodum illi viſum, hæc excernere, illa retinere ſtatuunt.*

5. *Namqve ut animæ vim magnam eſſe concedo, ita, humores ab illa immediate aliqvid pati, non mihi perſvadeo.*

IV

Aqvam ſalſam colatura dulcem fieri, licet multi affirment, nos in præſens negabimus.

III

VARIÆ IN OCULIS & NASO OBSERVATIONES NOVÆ &C.

THOMÆ BARTHOLINO HAFNIAM

QVOD ad intermiſſum diu officium adeo lentus redeam, partim itineri debetur, partim valetudini amicorum admodum imbecilli. Namqve & nobiliorum in vicinis provinciis urbium luſtratio multum temporis ſibi vindicavit, & ex itinere nobiscum ægrum Leidam reduximus *Haſebardum;* Amſtelodami autem *Walgeſteinium* graviter decumbentem offendimus; alternis itaqve modo hunc Amſtelodami, modo illum Lugduni viſitando rebus noſtris pro lubitu vacare non potuimus. Uterqve autem jam convaluit, *Haſebardus Borrichii, Walgeſteinius Burrhi* auxilio. Cum in itinere eſſemus, pro ipſo, qvem fruſtra qværebam, *Deuſingio Vindicias* illius Groningæ reperi, qvibus, licet mea impugnet verba, ipſum tamen Dominum *van Horne* aggreditur, & in illum omnem ſuam bilem evomit. Valde autem acuti ſenſus ſit, oportet, qvi tam levem attactum ferre neqvit. Dixi, eum *Bilſio* favere; dixi, in opinione de ſalivæ in glandulis ſecretæ origine *Bilſio* aſſenſum præbere; dixi, mirari me, qvod in chyli voce ex *Bilſii* mente explicanda occupatus iniqvæ poſtulationis *Bartholinum* accuſet; nec de eo præterea qvicqvam. Hæc verba adeo moverunt eum, ac ſi vel graviſſima dixiſſem. Inter alia, in controverſia, qvam tibi movit, mire ſe torqvet, &, qvæ aliorum reſpectu a te dicta ſolitarie ſumendo, ſtatum controverſiæ te inter & *Bilſium* de chyli per meſaraicas rubras motu eſſe defendit. Sed videtur occaſionem *Exſeqviarum Hepatis* aut ignorare aut reticere, & præterea admodum volante oculo *Spicilegium* tuum pervolviſſe. Namqve & verus lymphæ a te primum obſervatus motus de throno

hepar dejecit, & ipſe in *Spicilegio Secundo,* ubi de lymphæ motu Bilſiano agis, in hoc cardine obſervationum tuarum ſalutem verſari ais, & rogas, ut fidem ſuam brevi exſolvat. Sed his non conſideratis in chyli interpretatione Bilſiana hærens *Deuſingius,* ut chyli motum e lacteis in hepar demonſtret *Bilſius,* iniqva te conditione poſtulare dicit, ac ſi *Bilſius* hoc non promiſiſſet; cum tamen in *Epiſtolica Diſſertatione* dicat, contentum in lacteis ſuccum partim in hepar ferri, partim in thoracicum ductum, ſeqve illud ad oculum demonſtraturum polliceatur. Sed hæc & cætera in *Reſponſione ad Vindicias* ejus fuſius diducta videbis, qvam una cum *Diſputationibus* & adjuncto illis *De Oculorum Glandulis Tractatu* brevi, favente Deo, habebis; habuiſſes jamdudum, niſi varia etiam præter ante memorata impedimenta moram mihi injeciſſent. Dum autem hic occupatus ſectiones interdum ad partes voco, qvædam non ante viſa mihi ſe offerunt. Nam præter varia ſalivæ vaſa & illa lacrymalia in glandula oculi externa jam ante obſervata etiam in lacrymali caruncula duo ejuſdem generis vaſa obſervavi, ad cartilaginis latera utrinqve unum, qvæ ſtylum nullo negotio admittunt. De punctorum lacrymalium continuatione admodum manifeſta nihil addam, cum eam tibi a Clariſſ. *Borrichio* jam ante ſignificatam exiſtimem, & brevi cum *Tractatu de Glandulis Oculorum* de illa plura ſis viſurus. De alio vero excretorio vaſe, qvod in narium tunica non ita pridem obſervavi, dubia qvædam occurrunt, de qvibus a te informari optarem. Cum enim in ovillo, punctorum lacrymalium continuationem accuratius examinaturus, narium oſſa effringerem, vidi, remotis oſſibus, in narium tunica vaſculum lymphaticorum inſtar ſplendens anteriora verſus decurrere, ideoqve pro lymphatico reductorio habere cœpi. Cum vero, naribus ſectione apertis, ſupra manifeſtum continuati punctis lacrymalibus meatus egreſſum, foveam vel ſulcum anguſtum & nigricantem, per qvem in prædictum vas viam ſeta patentem invenit, notarem, & accuratius locum, ultra qvem ſeta penetrare non valuit, inſpicerem, patuit ex radicibus, qvas ibi agit, manifeſtis, lymphaticum excretorium eſſe. Mirum autem, in tunica non craſſa a minutulis iſtis glandularum portionibus tam elegans prodire. Sed magis miror, qvo fine humor ibi ſecretus ad narium extrema deducatur, cum oſtium ejus vix ad digiti latitudinem inde ſit remotum. Dicerem, excrementitium eſſe, ſed videmus in aliis corporis noſtri partibus excretum per ejuſmodi vaſa humorem certo

uſui deſtinatum, nec plane excrementitium eſſe, hic autem, cum vix extra canalem ſuum ſit, qvin ſimul ſit extra corpus, non video, cui uſui poſſit eſſe, ideoqve nec nomen illi invenio. Qvod ſi itaqve tuam mihi hac de re ſententiam communicare dignatus fueris, magno tua in me merita cumulo augebis.

Præter hæc etiam *Bilſii* experimentum de motu chyli, cum Amſtelodami eſſem, imitatus ſum; ſed illam in ſangvine diverſitatem non inveni, licet ad tertiam horam in vivis detinuiſſem canem, qvi vel integrum diem in hoc tormento vixiſſet: ſed cum unica vice tentaſſe non ſufficiat ad certi qvid concludendum, prima occaſione idem ſaxum volvam, licet fatear, me tam longis cruciatibus non ſine horrore illos torqvere. De Philoſophiæ certitudine multum gloriantur Carteſiani: vellem, ita certo mihi perſvaderent, ac ipſi ſunt perſvaſi, nullam eſſe brutis animam, nec differre, utrum bruti vivi nervos an automati, qvod actu movetur, chordas tangas, diſſeces, uras; vivi enim animalis viſcera & vaſa aliqvot horis ſæpius & libentius rimarer, cum multa videam inqvirenda, qvæ alia ratione non licet exſpectare. Vidi alias etiam in eodem ſubjecto thoracicum ductum deſcendenti a colli glandulis lymphatico continuum eſſe (ſtylus enim per illum immiſſus ad medium fere hujus adſcendebat, ulteriorem progreſſum impediente valvula) nec in axillarem immediate ſe exonerare, ſed in utriuſqve ductus concurſu (qvo etiam plura alia confluunt) alium formari canaliculum, qvi in gyrum ſinuatus circa axillaris jugularisqve confinium ſe in ſangvinem exonerat. Per hunc ex venis tum in thoracicum ductum, tum in lymphatica reliqva ſangvinem varie vaſa illa agitando tandem vi qvadam coegi refluere, ut ea de re certior eſſem. Sæpius ante ſtylo in axillarem per thoracicum viam in canibus fruſtra affectavi, nec unqvam diſtincte adeo ac tum temporis progreſſum ejus continuare valui. An ſæpius & certa qvadam via eadem obſervare licebit, proxima occaſione, ſi Deo placuerit, videbo.

Bilſius etiamnum ſilet, nec ſcio, utrum feriæ caniculares a maledicendo vacationem illi conceſſerint, an in perpetuum ab illo opere ſit feriaturus.

Qvod publica ſpectat, nihil in præſens ſcribenti ſe offert, niſi qvod febres hic plurimos invadant, qvorum multi non tam morbi qvam propria culpa ſuccumbunt. Necdum enim ulla malignitas obſervata, nec ullæ conſpectæ maculæ; Amſtelodami tamen qvam

hic magis ſæviunt, & retulit mihi ante paucos dies Clariſſ. *Golius*, ſibi a Medico qvodam Amſtelodamenſi per litteras relatum, una & eadem nocte plus qvam centum homines febri correptos ſine tamen ullis gravioribus ſymptomatibus. Sed nimis forſan te detineo, Clariſſime Vir, qvare hic abrumpo, & te cum tota familia tua valere jubeo, qvam humaniſſime rogans, tuo me amore & patrocinio fovere pergas, &, qvas feſtinans manus declinare non potuit, maculis iraſci parcas.

Dab. *Lugd. Bat.* Anno 1661. 12. Sept.

Clariſſ. *Borrichius* Te Tuosqve
qvam officioſiſſime ſalutat.

T.

Obſeqvent. Diſcip.

NICOLAUS STENONIS

IV

RESPONSIO AD VINDICIAS HEPATIS REDIVIVI

IV

Viro Clariſſimo & Experientiſſimo,

DN. ANTONIO DEUSINGIO,

Med. D. & Profeſſ. Celeberrimo,

NICOLAUS STENONIS
S. P. D.

QVOD & meas examini tuo diſputationes ſubjicere libuerit, Clariſſ. Vir, gratum mihi fuit, gratius futurum, ſi, qvibus indies diſtraheris, occupationes tantillum temporis adhuc reliqvum tibi feciſſent, donec eorum, de qvibus agitur, mentem, meamqve plenius percepiſſes. Ab aliis didici, praxin tibi tuam multum temporis eripere; ex ſcriptis vero, qvæ luci qvotidie exponuntur, te variis tum legendis, tum ſcribendis occupari abunde liqvet: omnibus autem manifeſtum eſt, defatigatum aliis curis & laboribus animum qvibuſdam in negotiis minus obſervari Lynceum, aciemqve ejus vel acutiſſimam non interrupta variorum ſpeculatione hebetari. Uno unum duntaxat tempore diſtincte percipiunt oculi, ubi autem ſine intermiſſione varia ſimul attente luſtrarunt, etiam in Sole non raro caligant. Non dubito itaqve, qvin, ſi otium tuum majorem in meis pervolvendis attentionem tibi permiſiſſet, tum illæ, qvæ nuper prodiere, *Vindiciæ* prodiiſſent nunqvam, tum alia, qvæ veritati indagandæ magis inſervirent, vel experimenta, vel argumenta fuiſſent allata. Non enim res ipſas in *Vindiciis* aggrederis, nec contenti in lacteis ſucci per lymphatica ad glandulas oris motum defendis: ſed hæc ſilentio involvendo ad verba verborumqve ſenſum deſcendis, & nos boni interpretis munere non functos magno conatu oſtendere

laboras. Licet autem verborum hoc examen, ſi nude inſpiciatur, tam parvi ſit ponderis, ut qvod illi impenditur tempus, ſine fructu periiſſe dicendum ſit, cum tamen placuerit tibi tantos in ſimpuvio fluctus movere, & non tam in me, qvam in Clariſſimum *Johannem van Horne*, qvi extra omnem culpam eſt, adeo acriter invehi, cogit me tum, qvi Præceptori debetur, affectus, tum, qvem ſibi qviſqve debet, honeſti nominis amor, rem totam planius exponere & oſtendere, nec Clariſſimum *Præſidem*, nec me talem meruiſſe cenſuram.

Cum non modo in dedicatione me theſium authorem profeſſus ſim, ſed & in ipſis theſibus, ut 4. 13. 14. 15. 32. aliisqve, manifeſta poſuerim indicia, unde Clariſſimo *Præſidi* eas non adſcribendas eſſe cuivis liqvere poteſt; non video, qvid tibi ſvaſerit ea uti inſcriptione: *Vindiciæ Hepatis Redivivi Leni Correctione Tangentes Seqviorem Interpretationem Clariſſimi D.* Johannis van Horne. Qvid enim aliud ea innuis, qvam qvod & ſingulis dein pagellis confirmas, te nulla habita prædictorum conſideratione omnia D. *Præſide* attribuere? Ne credas, Clariſſime Vir, me laudis adeo cupidum, ut aliorum labores pro meis venditarem, meqve diſputationis non defenſorem modo, ſed & authorem profiterer, qvæ ab alio eſſet conſcripta. Aliorum exemplo didici mendicatos titulos ſpernere, & ſi aliud nihil, vel ſola Horatiana cornicula me docuit, qvid ſit furtivis coloribus ſplendere. Mea autem eſſe experimenta, & meas, qvæ proponuntur, obſervationes, eorum, qvi ſemper fere ſecanti mihi adfuerunt, teſtimonio probare licet, ut Clariſſ. *Olai Borrichii*, Prof. Reg. Haff., *Chriſtiani Rudnicii*, Butovio-Pruſſi Med. Doctor., *Matthiæ Jacobi Matthiadis*, Med. Studioſi. Qvid qvod & Profeſſores hujus loci Celeberrimos D. *Sylvium* & D. *van Horne* teſtes producere poſſum, qvibus non diſplicuit mea interdum tyrocinia inſpicere. Sed nec Clariſſ. *Golius*, Mathematum & Orient. Ling. Profeſſ., Præceptor colendus, cum ſalivæ & lacrymarum vaſa in bubulo adornarem, ſpectatorem agere dedignatus eſt. Qvod ſi itaqve hominis tibi ignoti verbis fidem non adhibes, his ſaltem viris crede, & mihi, ſi qvæ habes, objice, nec *Præſidi*, cui ob publicas occupationes alias vix tantum otii tum fuit, ut ſemel eas reſolveret, qvæ mihi imputanda, vitio verte; aut ſi præſcriptam *Vindiciarum* p. 31. legem urges: erraverim ego, præſidio contenta probaverit *Præſes*, non tamen ideo errores ipſi tanqvam authori omnino adſcribendi, non in fronte operis omnium oculis nomen ejus exponendum. Doleo ſane, Clariſſ. Virum pro

præſtito mihi beneficio talia reportare, illi *ſeqviorem interpretationem* objici, contra illum in medium præferri, qvæ facere poſſunt *ad eruditos inter ſe committendos,* illi *inconſtantiam, oſcitantiam, imprudentiam, animum non ſatis ſerenum, nec ab affectibus vacuum, &c.* objectari. Doleo, inqvam, de illo talia narrari, cum nec ipſe qvicqvam commiſerit, nec in theſibus, qvæ Clariſſ. Vir tantopere urget, proponantur. Præcipua enim controverſia de venis meſaraicis, qvo nomine maxime in Dominum *van Horne* inveheris, adeo a diſputationibus meis aliena eſt, ut ſalva theſium veritate & cum *Præſide,* & tecum, & cum *Bilſio* amice conſentire poſſem, ſi ipſa conſentiret veritas. Ego enim de lymphaticis tantum ago, & oſtendo, Bilſianam de illis opinionem veritati minus conſonam, unde hoc tantum ſeqvitur: *Nihil ab inteſtinis per lacteas & lymphatica ad hepar fertur;* veſtra autem eſt ſententia: *Chylus per meſaraicas ſangvineas fertur ad hepar;* qvæ hic pugna? Nego, chylum ab inteſtinis ferri ad hepar per lacteas, ideone etiam nego, illum ferri per ſangvineas? Non itur hac via, ergo nec illa? Nullam hic invenio contradictionem, nec ulla ratione video, qvibus argumentis ex diſputatione mea deſumptis motus Clariſſ. *Præſidem inconſtantiæ* arguas; dicas, eum *videri in utrumqve latus claudicare,* cogaris *profiteri, te mirari, novos in re plana ipſum hepar concernente conatus inſtitui ab illo &c.* Qvem ego ſtatuo, lymphæ motum a lymphaticorum inventione defendit Clariſſ. *van Horne,* qvem ille chyli per meſaraicas ſangvineas motum, ut probabilem tuetur, ego ne verbulo tango; qvæ igitur hic inconſtantia? Qvæ occaſio iſta de venis meſaraicis movendi? Qvæ ratio talia proferendi, unde *videri poſſis,* ut p. 5. fateris, *velle viros eruditos inter ſe committere,* vel *diſcordiæ ſemina ſpargere inter eos, qvos non ignorabas amicos?* Qvod ſi vel graviſſima in te dixiſſem, ſanctiora tamen inter illos amicitiæ jura tibi eſſent, qvam ut talia proferres. Qvod autem chyli per meſaraicas ſangvineas in hepar motum attinet, licet de eo in theſibus nihil dixerim, cum tamen hic illam movere controverſiam tibi libuerit, paucis dicam, me necdum vel rationem, vel experientiam vidiſſe ſatis urgentem pro illo adferri; ſed nec perſpicere, cur *Vindiciarum* p. 26. ita loqvaris: *Rationi namqve ſoli hic fidere non poſſum ſecus atqve in motu chyli ad hepar per meſaraicas rubras.* Qvod ſi enim rationi tantum tribuis, ut in motu chyli ad hepar illi ſoli fidas, qvidni etiam in motu lymphæ eandem illi poteſtatem concedis? Si autem hic aliorum

experimenta exſpectas, qvis tibi promiſit, experimenta illi opinioni contraria cum tempore non poſſe oſtendi? Abſolutum nimis imperium rationi permittis in re, qvæ poſt detecta lactea plures invenit adverſarios qvam patronos. Qvid qvod & contrariam rationi tuæ experientiam jam exhibuerit Celeberr. *Pecqvetus* in *Nova de Thoracicis Lacteis Diſſert.*, Experiment. 1., qvod ſi ipſe fuiſſes imitatus, tam audacter ſoli rationi dictaturam non detuliſſes. Melius *Hippocrates*, qvi initio *Præception.*, ubi de ratiocinatione egit, tandem ſubjungit: Περὶ μὲν οὖν τουτέων ἄλις ἔστω διειλεγμένα. τῶν δ'ὡς λόγου μόνου ξυμπεραινομένων μὴ εἴη ἐπαύρασθαι, τῶν δὲ ὡς ἔργου ἐνδείξιος. Sed magis adhuc miror, qvod *Bilſii* de meſaraicarum uſu experimento tantum tribuas, ut contra Cl. *Bartholinum* ſuſcipias defendenda, qvæ nunqvam nec tentaſti ipſe, nec ab aliis vidiſti tentata. Diſputas de colore rei, qvam te non vidiſſe affirmas, & qvem alii **vry ſwart** appellant, parum tantum nigricantem interpretaris. Sed certus ſum, te, ubi illa expertus fueris, longe alia mente futurum. Feci experimentum in amicorum præſentia, obſervavi præſcriptam a *Bilſio* methodum, ligavi arterias, detinui in vivis canem primum per tres, alterum per qvatuor horas, qvi vel integrum diem ita vixiſſet; conſutum dein ventrem iterum diſſecui, eductum ex porta, cava, aorta ſangvinem aëri expoſui, ſed æqve cito concreſcebant, ſplendebant æqve, æqve nigricabant. Qvid igitur inde concludis? Sed & ratio *Bilſii*, qva probat, contentum in portæ ramis ſuccum cum ſangvinis natura affinitatem habere, gratis affertur, cum non modo hoc largiamur, ſed & eſſe ipſum ſangvinem ultro concedamus; nihil itaqve illa ratione agit. Nec, qvæ de colore denſo, ſubobſcuro, obſcuro, cinericeo infert, qvicqvam probant; examina, qvæſo, eductum venæ ſectione ſangvinem, & vide, qvam varios in variis ſubjectis obſervare liceat colores. Sed hæc mitto.

Cum itaqve pateat, nec *Præſidis* eſſe, qvorum nomine leni illum correctione tangere voluiſti, tetigiſti autem acriter, nec ullo jure, qvæ de chyli per meſaraicas rubras motu affers, hic locum habere: oportet, ut omnia, qvibus eum perſtrinxiſti, in me tranſferam, & dicam, mutato nomine de me omnia narrari. Sed nec me, qvæ objicis, meruiſſe, oſtendere mox aggrediar, ubi in anteceſſum monuero, me omnia, qvæ affectibus tuis, non forſan tibi ipſi, deberi, æqvus lector judicabit, qvalia ſunt oſcitantia, imprudentia, oculi diſtorti, obliqvus intuitus, iniqva diſputatio, & qvæ cætera vel abſolute, vel ſub con-

ditione poſita, hæc inqvam, omnia tranſiturum, & ipſa rerum momenta candide expoſiturum; qvid enim ejuſmodi verbis efficitur, qvam ut magis magisqve commoveantur animi, atqve ita res ipſa non ea, qva decet, attentione examinetur? Ægre ferrem, ſi in theſibus vel unicum verbum de te poſuiſſem a commoto animo profectum: ſed nec de *Bilſio* aliud dixi, qvam qvod ipſe, ſi cum eo fueris locutus, non negares; idcirco dixi, indolem ejus ex ſermonibus & ſcriptis dignoſcendam, qvid autem ſunt hæc ad illa, qvibus adeo acerbe ſine omni ratione *Barthol.*, Præceptorem meum, agreſſus eſt? Qvod vero, qvæ ego *Bilſio*, tu tibi attribuis, qvo jure id agas, non video. Non dixi, te omnibus illius favere, ſed qvibuſdam, & qvis vitio mihi verteret, ſi ego in re, qvæ vera, aſſenſum præberem homini vel omnium hominum perditiſſimo, ideone etiam ego ejuſdem farinæ eſſem cenſendus? Ne putes, Clariſſ. Vir, qvenqvam æqvum rerum arbitrum (de aliis non loqvor, cum etiam optime dicta peſſime liceat interpretari) illum, qvo *Bilſium* proſeqveris, favorem adeo late extenſurum, ut etiam *Bilſii* vitia tibi ſit adſcripturus. Sed & iraſci mihi parce, qvi de te nihil dixi, niſi qvod ex ſcriptis tuis cuilibet eſt manifeſtum. Dixi theſ. 25: *Nobil.* Bilſius & Bilſio *favens Clar.* Anton. Deuſing.; theſ. vero 42: *cui de ſaliva opinioni aſſenſum præbet Clar.* Ant. Deuſing. Qvid in his verbis tali cenſura dignum? Qvæ hic cauſa tales fingendi ſuſpiciones? Qvod ſi ipſe te *Bilſio* favere dicas, ſi partes ejus, in qvantum tibi videntur veræ, contra adverſarios ſuſcipis defendendas, qvid in me excandeſcis, qvod, qvæ ipſe profiteris, ego dicam? Nimis arctas ſcribendi leges nobis figis, ſi, ubi de re agitur, authores teſtes adducere non permittis: qvi p. 30. ais: *Qvid miſceor perſonis, ubi de rebus agendum?* Qvid ſi ad hanc legem tua examinarentur? Sed qvantum video, in eo erravi, qvod dicendum fuiſſet, non te *Bilſio*, ſed illum tibi aſſenſum præbere, ut p. 28. liqvet: *Qvamvis certe hic potius, ubi vere conſentimus, ſentiat nobiſcum, noſtrasqve ſententias paſſim, etiam ante* Bilſii *nomen eruditis cognitum, publice expoſitas, videatur ſuis experimentis confirmare;* qvaſi vero etiam de eo certandum eſſet, uter dicendus alteri aſſenſum præbere, nec utriqve æqve convenire poſſet. Fac, te mentis oculis illa primum vidiſſe, *Bilſium* autem oculis corporis eadem primum obſervaſſe, nonne eodem jure experimentis ejus aſſenſum præbere diceris, qvo tuis ille rationibus? Notum omnibus, *Bilſium* tua nunqvam legiſſe, ſed & te, qvæ ejus

ſunt, nunqvam vidiſſe, affirmas: qvid igitur refert, uter alteri aſſenſum præbere dicatur, maxime cum & tua ratio & ejus experientia in illo caſu ejuſdem ſint ponderis?

Sed mittam hæc, & eo pergam, ubi verba & ſenſum detorſiſſe dicor, oſtendamqve, me *Bartholini* tuamqve & *Bilſii* mentem percepiſſe, nec aliter ac eſt propoſuiſſe; qvod ut fiat, meum prius exponam, neceſſe eſt, ſenſum, ſimulqve dictorum occaſionem.

Boni enim interpretis eſt, non ipſa modo verba ſeorſum conſiderare, ſed & cum antecedentibus ſimul & conſeqventibus conferre. Præſtat enim, ubi de re agitur, ſenſum authoris integrum, qvam ipſa ejus verba proferre, niſi &, qva occaſione eadem verba fuerint prolata, ubi opus, ſubjungatur. P. 31. ais: *Vir candidus ipſa aliorum verba proferat, qvos vult laudare, vel repudiare (ſic ago cum aliis, dum veritatem inqviro) vel ſaltem non detorqveat & verba & ſenſum, nec dubiis locutionibus præjudicia creet.* Videamus itaqve, uter noſtrum magis candide egerit, tu ne, qvi ipſa aliorum verba profers, an ego, qvi eorundem ſenſum. P. 19., ut probes, *Bartholinum* iniqva conditione a *Bilſio* flagitare demonſtrationem motus chyli e lacteis ad hepar, ipſa *Bartholini* verba ex *Spicileg. 2.* adducis, ubi ipſe ſtatum qvæſtionis determinat; de motu chyli per meſaraicas ad hepar, qvem negat, hinc p. ſeq. ita infers: *Qvod ſi autem iſte ſit ſtatus controverſiæ, exponente ac confitente ipſomet* Bartholino, *qvid poſcit a* Bilſio, *ut demonſtret ſibi ingreſſum chyli in hepar per lacteas venas, qvo ad reſurrectionem hepati aditus pateat, ſeu ſangvificationis munus eidem aſſeratur? An non iniqva conditio eſt, dum* Bilſius *promittit, ſe demonſtraturum chyli immediatum ex ventriculo ſeu inteſtinis in hepar ingreſſum per meſaraicas rubras (qvem pernegat* Bartholinus) *ab ipſo poſtulare, ut demonſtret chyli in hepar ingreſſum per lacteas: qvem motum chylo, ſeu ſucco nutritio, de qvo ſolo qvæſtio eſt (non de lympha ſeu rore), ipſa negat natura judice* Bilſio? *An ſcopum ferire illa conditio cenſenda, ſub qva demum aſſenſus reſurrectioni hepatis haud difficilis promittitur?* Qvis lectorum, qvi *Bartholini Spicilegia* non evolvit, hiſce tuis verbis fidem non adhibebit, & credet, *Bartholinum* ſibi ipſi contrarium, vel ſui oblitum in *Spicileg. 2.* talem controverſiæ ſtatum formaſſe, in *Reſponſione* autem longe alia poſtulare? Qvi vero ipſum *Spicilegium* inſpexerit, qvi viderit, *Bartholinum* duo ſibi ſumere refutanda, &, in prioris examine occupatum, dum videt, ex primo experimento concludi

id, de qvo non qværitur, dicere: & *qvanqvam chylum ſangvini commixtum cum aliis largiremur, id tamen hoc loco non qværitur. Qvæſtio eſt, an ſuccus ille nutritius, chylus dictus, ex ventriculo cor primum petat &c.;* hoc vero refutato alterum membrum aggredi, & de lymphæ motu varia, qvæ ſuo loco afferemus, proponere: videbit facile, ſtatum controverſiæ in primo membro formatum longe diverſum eſſe ab eo, de qvo in ſecundo agitur, nec ad illa de lympha reducendum. Qvod ſi itaqve verba tua ſecundum veri interpretis leges forent ſupplenda, talia eſſent. Qvod ſi autem, ubi de meſaraicarum rubrarum uſu cum *Bilſio* diſputat *Bartholinus,* iſte ſit ſtatus controverſiæ, exponente & confitente ipſomet *Bartholino,* qvid, cum de lactearum & lymphaticorum uſu agitur, poſcit a *Bilſio,* ut demonſtret ſibi ingreſſum chyli in hepar per lacteas, qvo ad reſurrectionem hepati aditus pateat, & ſangvificationis munus eidem aſſeratur? Atqve ita videbit qvilibet, qvi *Epiſtolicam Bilſii Diſſertationem* legit, qvi occaſionem *Exſeqviarum Hepatis* novit, æqvane an iniqva ſit illa conditio, qvam *Bilſio* proponit *Bartholinus,* de qva infra pluribus. Sed & ſimul obſervabit, qva fide *Bartholini* verba fuerint adducta, & an ſemper tutum ſit credere illis, qvi, qvæ de aliis proferunt, ipſis illorum verbis probant. Multa enim aliorum reſpectu vera ſunt, qvæ per ſe poſita ſunt falſiſſima, ſic reſpectu primi membri a *Bartholino* in *Spicileg. 2.* refutati verum eſt, hunc eſſe ſtatum controverſiæ, ſi vero abſolute ſumas, neqvaqvam verum. Ut enim duo præter communem opinionem afferit *Bilſius,* ſic & duo diverſi ſunt ſtatus controverſiæ, & dum hoc loco hunc eſſe ſtatum controverſiæ dicit, non negat alio loco alium eſſe. Invitus hanc de interpretis munere controverſiam moveo, qvam ſilentio involviſſem, niſi tuæ illam *Vindiciæ,* qvaſi vi, mihi extorſiſſent. Ut enim oſtendas, me ſiniſtre interpretatum tua verba, verba tua in alienum ſenſum detorſiſſe, &c., ipſa verba *Bartholini, Bilſii,* tua, mea profers, atqve ita apud lectores, qvi qva occaſione ſingula fuerint dicta, ignorant, fidem ſtatim invenis; ut itaqve illud a me crimen removerem, prius modus, qvo in me uteris accuſando, erat examinandus. Jam autem in theſibus a me propoſita aggrediamur, & videamus, egone tua verba in alienum ſenſum detorſerim, an tu potius mea minime fueris aſſeqvutus.

Cum *Diſputatione de Glandulis Oris & nuper Obſervatis inde Prodeuntibus Vaſis Prima* hiſtorice omnia propoſuiſſem, reliqvum erat,

ut & de uſu qvædam ſubnecterem; hinc *ſecundam* addidi, ubi ſtatim in initio, qvod ex obſervatis ſponte fluebat, propoſui, *glandularum munus eſſe eum, qvi in ore perpetuo reperitur, humorem præparare;* adjunxi etiam exempla, ut oſtenderem, ad alias vias ſalivam in os immediate deponentes non recurrendum. Jam reſtabat qværendum, unde mediate ſaliva eſſet deducenda, qvod maxime dubium; a glandulis enim in os prodire ad oculum demonſtrare licet, unde autem oriatur ille in glandulis præparatus humor & ora rigans, non item. Poterit enim a cerebro derivari, & qvidem vel per nervos, vel alias vias occultas; poterit a corde deduci per arterias; poterit etiam a glandulis advehi per lymphatica. Hæc theſ. 25. enumeravi; & cum hæc de lymphaticorum uſu opinio recentiſſima eſſet, patronos ejuſdem nominavi, primum ſcilicet authorem *Bilſium,* & huic in præſenti negotio aſſenſum præbentem *Deuſingium.* Ut autem manifeſtius evadat, me theſ. 25. agere de viis in glandulas, non in os, adducam & theſ. 29., ubi, qvod priori me acturum promiſi, aggredior: *Examinata ſic cum glandulis ſaliva, reliqvum eſt, ut vias materiam ejus advehentes indagemus. Qvod ut commodius fiat, partes, cum qvibus glandulæ commercium habent, ſingulas proponemus, & qvibus mediis vel aliqvid inde accipiant, vel eo mittant, inqviremus, ut ſuus ſingulis attribuatur uſus.* Hinc ſeorſum cor, nervos, glandulas conglobatas examino, qvemadmodum theſ. 25. pollicitus eram. Theſi vero 42., ubi ad *Bilſium* deventum, dixi, eum humores in corpore aqveos ipſamqve ſalivam a ductu rorifero, non autem a ſangvine, derivare, teqve illi in hac de ſaliva opinione aſſenſum præbere. Scilicet cum & *Bilſius,* e glandulis immediate ſalivam oriri, ſtatuat, mediate vero e ductu rorifero, cumqve ipſe, qvam e glandulis maxillaribus promanare, ais, aqvoſam materiam ad glandulas per ramos roriferos ordinarie (de ordinario autem affluxu hic tantum loqvimur) deferri videri, dicas, ſangvinis autem nullam facias mentionem, qvid manifeſtius, qvam te illi in hac de ſalivæ mediata origine opinione aſſenſum præbere? Sed his non conſideratis *Vindiciarum* p. 23. primo, an non potius *Zaſſii* ſenſum pro *Bilſii* mente ſubſtituam, dubitas, hinc propria verba proferendo oſtendis, te non unam, ſed vel triplicem ſalivæ materiam conſtituere, adeoqve conqvereris tandem, qvod, non obſtantibus verbis adeo manifeſtis, dicamus, te *Bilſio* favere, atqve aſſenſum præbere hujuſce de ſaliva opinioni, qva nimirum hanc unice a rorifero ſucco per vaſa communiter

lymphatica dicta advecto derivat. Qvod primum attinet, de re non dubia dubitando, te necdum *Bilſii* mentem percepiſſe, oſtendis. Qvid enim clarius, qvam eum ſalivam reliqvosqve humores aqveos inde deducere? Videamus *Epiſtolicam* ejus *Diſſertationem*, ubi de ductus roriferi diſtributione ita loqvitur: *Et ne diſtingvam omnia, deniqve in glandulas ſputuitarias, lacrymales, pituitarias cæterasqve omnes & ubique influit, aut terminatur.* Et circa finem de rore ſuo: *Id qvidem perceptu facile erit, ſi jam lacrymas, phlegmata, ſalivas, ſudores, capillos, ungves ab illo provenire, totumqve corpus nutritioni ejus irroratione aptum reddi, omniaqve naturæ fermenta ex eo derivari, ad oculum oſtendatur: Qvod qvidem fiet, &c.* Qvis hic dubitandi locus, ubi verba ſunt adeo manifeſta? Qvod vero ſecundum ſpectat, qvæ non negavi, tanqvam negata, probas. Loqvor de præparata in glandulis ſaliva, qvam, te a lymphaticis, non autem ab arteriis, deducere, ipſa tua verba oſtendunt, tu autem, ac ſi de viis ſalivam in os immediate deferentibus egiſſem, plures te adduxiſſe, probas, qvod a te factum non negavi. Qvod ſi itaqve aliqvid obtinere vis, hoc tibi probandum: *te cum* Bilſio *ſecretam in glandulis ſalivaribus ſalivam a roriferis ramis ordinarie non deducere unice, ſed a ſangvine.* Dum vero credis, te partem ſalivæ a ſangvine deducendo mihi aſſenſum præbere, a mente mea multum recedis. Duas enim ſalivæ vias immediatas proponis, ductus ſalivares puta & arteriolas, ſeriqve aqvoſiorem portiunculam per arteriolas ad os & palatum exſudantem ab illa, qvæ a glandulis procedit, diſtinctam vis; cum ego arterias non immediate ad os deducam, nec ſalivaribus ductibus opponam, ſed ſubordinem tanqvam vaſa illis materiam ſubminiſtrantia. Nihil itaqve minus, qvam mecum ſentis, qvi ſeri ex arteriis exſudationem, qvalem hic innuis, & Clariſſ. *Schneid.* tom. 3. ſect. 2. c. 3. p. 509. expreſſe deſcribit, necdum a qvoqvam vidi probatam, adeoqve pro mero ingenii fœtu judico habendam. Omnibus enim in locis, qvæ laudatus modo Vir Celeberrimus p. 554. catarrhorum pro fontibus habet, glanduloſas carnes etiam ante viſum mihi tomum ejus tertium obſervavi, & amicorum oculis ſubjeci. Sed & in epiglottide non glandulæ modo, ſed etiam excretoria vaſa per ipſam cartilaginem in partem oppoſitam penetrantia accuratius ea examinanti manifeſta ſunt, & in narium tunica ad latus illius ductus, qvi a punctis lacrymalibus ad anteriora narium defertur, aliud excretorium vas a minutis iſtis glandulis ortum

nuper obſervavi, ut adeoqve veros catarrhorum fontes conglomeratas glandulas nobis præbere exiſtimarem, qva de re alibi, ſi Deo ita viſum, fuſius. Sed neqve dum ſalivæ diverſam naturam agnoſco, & humorem mixtum profiteor, te mihi potius qvam *Bilſio* faventem invenio. Non enim inde ſeqvitur, me aliud, præter ſangvinem arterioſum, ad partes vocare. Non ſeqvitur: Saliva eſt humor mixtus, ergo non a ſolo ſangvine eſt. De tertia ſalivæ materia, qvam a cerebro ad glandulas defluere ſtatuis, theſ. 22. dixi, nos fruſtra ad occultas vias confugere, cum adſint manifeſtæ. Multas qvidem a cerebro in os & hinc viciſſim in cerebrum patentes vias recenſet Clariſſ. *Falckenburgius* in *Epiſtola ad Johannem Neandrum de Tabaci Fumo,* ſed videtur oſſa capitis denudata potius, qvam ipſum caput omnibus partibus inſtructum conſideraſſe. Non negabo, poſſe tales reperiri vias, ſed nec adeſſe credam, anteqvam adeſſe videro. Qvod ſi itaqve vel ratione qvadam inexpugnabili, vel experientia certa ejuſmodi meatus a cerebro in os oſtenderis, magnam apud omnes veri cultores inibis gratiam. Cum itaqve nec ex cerebro in glandulas, nec ex arteriolis in os qvicqvam immediate deferri ſtatuam, ſed ex arteriis in glandulas, patet, te nulla in re mecum ſentire; cum autem, qvod in glandulis ſalivaribus ſecernitur, per ramulos roriſeros ordinarie adferri videri dicas, ſangvinem reticendo, omnibus manifeſtum eſt, te *Bilſio* aſſenſum præbere.

Eadem theſi 42. expoſita *Bilſii* de lymphæ motu ſententia, adductoqve, qvo ille ſemper provocat, experimento, addidi, *hunc eſſe chyli motum, qvem ſibi demonſtrari in* Spicilegio 2. *D.* Bartholinus *cupit, qvem* Bilſius *in* Epiſtolica Diſſertatione *adſtruit, qvem D.* Borrichio, *me præſente, in vivo cane voluit demonſtrare, ut mirer, D.* Deuſingium, *in chyli nomine ex* Bilſii *mente explicando occupatum,* Bartholinum *iniqvæ poſtulationis accuſare. De illo enim humore loqvitur, qvi in lacteis meſenterii continetur, & qvem inde ex parte per lymphatica in hepar deferri* Bilſius *demonſtrandum ſuſcepit.* Non hic paria illis, qvibus me in horum examine aggrederis, referam: dixi enim, me tuis hæc affectibus, non tibi, adſcripturum; nec agam de ἀκυρολογίᾳ, qvam ita fuſe taxas, cum omnibus, qvi vel epiſtolas Veterum triverunt, notum ſit, amicos ſe invicem in litteris inviolata amicitia accuſare, nec vocem accuſandi adeo arctis incluſam eſſe limitibus; & mollias, qvantumlibet illa de iniqva conditione, qva, qvod non promiſit *Bilſius, Bartholinus* ex tua ſententia flagitat,

explicesqve qvam amiciſſime, me ſane repugnantem nunqvam invenies. Nec enim eo hæc fine unqvam propoſui, ut te *Bartholino* inviſum redderem, cum ſciam, genus hoc proxenetarum Diis hominibusqve inviſum eſſe. Sed his miſſis oſtendam, *Bartholinum* nihil nec in *Spicilegio Secundo*, nec in *Reſponſione de Experimentis Anatomicis Bilſianis* (cujus loci citatio in theſibus fuit omiſſa) poſtulaſſe, qvod non promiſit *Bilſius*, ut adeoqve omnibus patere poſſit, te in re clara verbis obſcuranda neqvicqvam occupari. Videamus *Bartholini* verba. Cum *Spicileg. 2.* cap. ultimo p. 100. & ſeq. de chylo & lympha *Bilſii* mentem expoſuiſſet, & ſingula examinaſſet, tandem in fine tractatus addit: *Eo vero* (ſcil. rore) *totum corpus nutritioni aptum reddi, irroratione & fermentatione, promittit, ſe aliqvando ad oculum demonſtraturum. Qvanqvam de rore ſolo, ſi a chylo diſtingvatur, non repugnarim, qvia tamen aliter illi viſum, nos magno deſiderio iſtas demonſtrationes exſpectabimus, ut proprius remoto velo intueamur, qvid Nobiliſſimo Viro Natura revelaverit, & ut fidem ſuam brevi exſolvat, qvanto poſſumus officio, rogamus. Optamus, ut ſuſcepti negotii curſus illi arrideat, &c.* In *Reſponſ.* autem p. 10. ait: *Nec animum obfirmabo facilis ad applauſum, ſi iſtis Anatomiæ Profeſſoribus, præter alia, demonſtraveris chyli ingreſſum in hepar, ſed immediatum ex venis lacteis, non rubris meſentericis per longas ambages, qvibus cum ſangvine mixtus, chyli propriam appellationem amiſit.* Qvis æqvus rerum arbiter non videt, *Bartholinum* hic ejus, qvod in lacteis continetur, motum ſibi petere demonſtrari, maxime cum adeo expreſſa habeantur verba? Scilicet in primo loco loqvitur de roris diſtributione totali in totum corpus, in ſecundo de ejuſdem diſtributione partiali in hepar. Qvid autem Ros hic aliud *Bilſio*, qvam contentus in lacteis meſenterii ſuccus? at hunc, qvotieſcunqve lac referre viſus eſt, chyli nomen a prima lactearum inventione obtinuiſſe qvadraginta fere annos omnibus notum. Non hic repetam ſuperius dicta, qvo jure illa de ſtatu controverſiæ *Bartholini* verba contra me adduxeris, qvaſi in *Spicileg. 2.* tantum de vaſis meſaraicis rubris ageretur, cum cuilibet *Spicileg.* pervolventi patere poſſit, etiam de lacteis & lymphaticis qvæſtionem eſſe, unoqve poſito alterum non excludi; ſuffecerit mihi oſtendiſſe, *Bartholinum* non modo in *Reſp.*, ſed & in ipſo *Spicilegio* de contento in lacteis ſucco agere, ejusqve motum ſibi petere demonſtrari. Hunc autem aliorum ex mente chylum, ſecundum propriam vero opinionem rorem, a lacteis &

in hepar & in reliqvum corpus deferri demonſtraturum ſe pollicetur in *Epiſtolica Diſſertatione Bilſius. Pergo igitur,* inqvit, *liqvor ille, qvem ab uſu rorem dicimus, venas lacteas per earum in inteſtinis aperta oſcula invadit, & ſeorſim congregatis canalibus in duas ſe vias divi-dit, illa ad glandulam, qvæ venæ portæ affigitur, ducit, atqve inde vaſa lymphatica propagat jecori: altera in glanduloſo meſenterii receptaculo convenit, unde totum corpus ramis evidentibus inferius ſuperiusqve inſtaurat, &c.* Sed, dicas, de reſurrectione hepatis agitur, adeoqve de veri chyli & proprie ita dicti motu, *Bilſius* autem, lactearum contentum chylum eſſe, pernegat; hinc addis p. 17: *Interea vero, ne credat Vir Clariſſ., adeo vecordem eſſe* Bartholinum, *qvi velit ſe facilem præbere in admittenda hepatis reſurrectione, ſi modo ipſi pro-betur a* Bilſio, *humorem illum, qvi in lacteis meſenterii continetur, qvem a lympha* Bilſius *non diſtingvit, per ipſa illa lactea ſeu lym-phatica vaſa in hepar deferri: cum ne ipſe qvidem* Bilſius *illum hu-morem idoneum agnoſcat, ex qvo ſangvis qveat generari.* Sed, qvan-tum video, *Exſeqviarum Hepatis* occaſionem aut ignoras, aut igno-rare te ſimulas: hanc enim ſi conſideraſſes, in illa nunqvam verba erupiſſes. Inſpice enim, ſi placet, c. 8. *Vaſ. Lymphat. Barthol. in Animantibus Inventorum,* ubi inter alia ita loqvitur: *Igitur ſi qvidem vaſcula nonnulla circa hepar ſemper obſervavi, hactenusqve pro lacteis habui, jure juſto, donec aliud perſvaderet Naturæ favor, chylum ad hepar partim diſtribui, partim ad cor exiſtimavi: jam vero, qvia primis nobis Hafniæ tam nuper licuit eſſe oculatis, ut, qvid ſint vaſa illa exilia, unde progrediantur, qvem uſum præſtent, in animalibus diligenter eviſceratis inveſtigaverimus, noluimus antiqvatæ opinioni obſtinatius in-hærere, aut labantes hepatis derelicti partes diutius ſeqvi. Vidimus qvippe vaſa illa prope hepar eſſe ſui generis, a contento liqvore* Lympha-tica *nobis dicta, ex hepate ad receptaculum aqvam inferre, ligataqve intumeſcere prope hepar, adverſa vinculi parte inaniri, ſimiliaqve eſſe & ſubſtantia & colore & contentis & uſu illis, qvæ ex artubus & in-ſimo ventre alias primi aperuimus. Hoc invento novo ſpe omni ſan-gvificationis excidit tot ſeculorum applauſu decantatum hepar, qvod ne ſalus ipſa ſervaret amplius, &c.* Qvod ſi itaqve lymphæ motus *Bar-tholino* occaſionem dederit hepati exſeqvias ſcribendi, ſeqvitur, motu hoc negato, etiam has fruſtra ſcriptas. Qvod cum fecerit *Bilſius,* non ſine jure demonſtrationem ejus flagitat *Bartholinus,* nec pro vecordi habendus, ſi velit ſe facilem præbere in admittenda hepatis

reſurrectione; modo ipſi probetur a *Bilſio*, humorem illum, qvi in lacteis meſenterii continetur, per illa deferri ad hepar. Qvid enim manifeſtius? *Qvod in lacteis continetur, in hepar non deferri, cum obſervaret* Bartholinus, *detexit nobis lymphatica, & hepati exſeqvias ſcripſit. Qvod in lacteis continetur, deferri in hepar, ſtatuit* Bilſius, *ejusqve demonſtrationem promittit;* ergo, ſi vera hæc, ruit *lymphaticorum inventio*, ruunt *hepatis exſeqviæ.* Vidit hoc ipſe Clariſſ. *Bartholinus*, qvi *Spicileg.* p. 104., membro ſecundo, qvod de rore agit, ſubjungit: *In hoc cardine ſalus obſervationum noſtrarum volvitur.* Cum itaqve res adeo perſpicua ſit, qvid in verbis hæres, & Bilſianam chyli interpretationem urges, qvaſi vera rerum vocabula a *Bilſio* eſſent exſpectanda? De motu humoris lactei agitur, non de nomine, qvem ſi, ſecundum promiſſa, oſtenderit *Bilſius*, aſſenſum obtinuit & applauſum.

Cum itaqve ſatis pateat, qvæ de *Bartholino*, de *Te*, de *Bilſio* propoſui, licet ipſa adjungere verba conveniens diſputationi brevitas non permiſerit, ſenſui tamen veſtro verbisqve conformia eſſe: tranſibo cætera, & de ſuſpicionibus, qvas tibi formas, æqvo Lectori judicium committam. Interea ſi ulterius mea examinare placuerit, tantum temporis tibi indulgeas, rogo, ut cum verbis verborum conſideres occaſionem. Mallem tamen, ipſas res aggredi liberet, &, ſi qvid vel experimentis, vel rationibus a me allatis deeſſe videris, proferre: invenires enim me æqve promptum ad argumentis tuis, ſi ratione nitantur & experientia, cedendum, ac ad iiſdem, ſicubi prædicta defuerint, reſiſtendum. Vale.

Lugduni Batav.

Anno 1661, 28⁄18. Novembr.

DE GLANDULIS OCULORUM NOVISQVE EARUNDEM VASIS OBSERVATIONES ANATOMICÆ

VIRIS CLARISSIMIS & EXCELLENTISSIMIS,

D. SIMONI PAULLI,
Medico Regio & Prælato
Aarhuſienſi,

D. FRANCISCO DE LE BOE
SYLVIO,
Medicinæ Practicæ,

D. GEORGIO HILARIO,
Mathematico & Litteratori,

D. JOHANNI VAN HORNE,
Anatomiæ & Chirurgiæ,

D. OLAO BORRICHIO,
Polyhiſtori & Naturæ Conſulto,
illi olim,
his hodie
in Regia Haf. Academia

D. JACOBO GOLIO,
Matheſeos & Lingvæ Arabicæ

in Alma Lugduno-Batava Acad.

Profeſſoribus Celeberrimis,

Præceptoribus optime meritis, ætatem colendis.

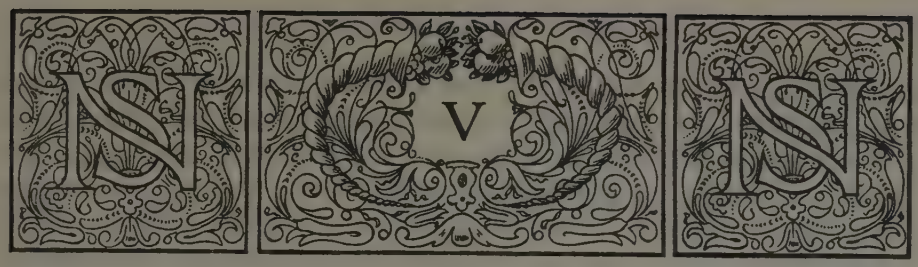
QVÆ *nova ſe vobis hic ſiſtunt,* Præceptores, *non eo nomine pro novis venditantur, ac ſi jam primum eſſent producta. Antiqva ſunt, ipſis, qvi ſe* προσελήνους *jactabant, Arcadibus, & univerſo adeo hominum genere antiqviora, utpote, qvæ brutis ante conditum hominem, id qvod ſacra teſtatur pagina, creatis connata. Nec qvod nunqvam ante obſervata credam, ideo nova nuncupo; licet tot tamqve diſcrepantes de origine lacrymarum viisqve opiniones, qvot in mare flumina decurrunt, id tantum non demonſtrare videantur. Exiſtimat Ingenioſiſſimus* Stevinus, *ſuſpicantur alii, fuiſſe ſeculum in ſtudiis aureum: nec dubito, qvin omnia Veterum ſcripta nobis ſi adeſſent, multa, qvæ hodie nova & magno cum labore qvæſita miramur, ſine ſudore, ſine ſangvine inde licuiſſet addiſcere. Cum vero mihi nova ſint, ut qvæ nullius vel manus, vel vox, vel ſcripta mihi detexerint, cum inclyta Nobiliſſimæ Lugdunenſis Academiæ Theatra Anatomica novis ea annumeraverint, ſi rem, ut eſt, verbis non exprimerem, levitatis eſſet non leve argumentum. Nec enim illorum ego ſupercilium moror, qvi in aliorum labores involant, ipſi manum operi nunqvam admoventes; his enim, ſi qvid auſi fuerint, veſtrum,* Celeberrimi Viri, *applauſum, veſtram authoritatem oppono. Qva ego tutus ægide paucis illa proponam, qvæ pluribus diducere licuiſſet, ſi vel, qvæ ex dictis ſponte profluunt, fuſius evolvendo, tempus terere mens fuiſſet, vel aliorum ſcrinia compilando, lectoribus faſtidium, mihi* Criſpini *famam conciliare intenderem. Vos itaqve tenellum hunc fœtum veſtro ſinu excipite, &, qvo me hactenus proſecuti eſtis amore, amplexari pergite,*

Celeberrimi Viri,

Diſcipulum vobis addictiſ:

NIC. STENONIS

Lugd. Batav.
Anno 1661.
6. Decembr.



QVOD Mechanicos uſus docuit, forſan & in animalibus facta obſervatio, *ut ad motum faciliorem reddendum res movendas humore unctuoſo oblinerent;* hoc in prima animalium fabrica Mechanicus omnium ingenioſiſſimus qvam perfectiſſime obſervavit. Viderunt illi, ſi movendum inter & fixum, ſuper qvod motus fieri debet, tertium motu facilius intercedat, opus longe commodius procedere, hinc, ut ſuppoſitis cylindris in æqvora navem propellunt, ſic &, ſuper qvem rota volvitur, polum liqvore pingviori inungentes gyrationem facilius expediunt. Sic & alios motus, qvorum exemplis officinæ hinc inde abundant, qvieſcentem a mobili ſuperficiem intercedente ſubpingvi liqvore dividentes, minori cum moleſtia perficiunt.

In automatico autem animalium corpore artificioſius, imo divinius, hæc omnia geruntur; ibi enim & humor, qvi ſubminiſtratur, &, qvo ſubminiſtratur, modus longe majus artificium commonſtrant. Partes qvippe ita diſpoſitæ ſunt, ut in vicinia, velut in promptuario, reconditus liqvor pro majori minorive uſu parcior aut copioſior, nobis ne attendentibus qvidem, exprimatur, inde, ubi munere ſuo functus, per alias vias alias ad partes iterum abducendus. Sic partium in ore motus accedente ſaliva promoventur; ſic deglutitionem expreſſus ab ipſa re deglutienda ex ſubſtratis tunicæ glandulis unctuoſus mador leviorem reddit. Eodem fine totus inteſtinorum canalis interiori parte viſcida pituita eſt obductus; nec aliam ob cauſam in pleriſqve aliis noſtri corporis partibus moderata certi

humoris copia reperitur. Sed præ cæteris in oculis elegantiſſime hæc conſpiciuntur; ibi enim &, qvæ palpebrarum motui inſervientem humorem afferunt, &, qvæ eundem alio inde derivant, vaſa peculiaria ſe offerunt conſideranda. Qvæ cum nondum ita notata ſciam (afferentia enim necdum deſcripta puto, efferentia vero, licet principium habuerint omnibus manifeſtum, continuationem tamen eorum magnis ſeculi hujus Anatomicis non innotuiſſe, ex ſcriptis eorundem patet), ſtatui ea in præſens, ut in brutis variis, præſertim vitulis, a me obſervata, una cum glandulis deſcribere.

Glandulæ autem *interiorem palpebrarum ſuperficiem humectantes* binæ ſunt, *lacrymalis* altera, altera Clariſſ. *Whartono innominata* dicta, ex conglomeratarum genere utraqve. Videtur qvippe conglomeratarum hoc eſſe munus, ut peculiarem per lymphatica excretoria excernendum humorem præparent: qvod ante tantum in pancreate & maxillarium inferiore obſervatum, jam vero in pluribus aliis manifeſtum; ut præter illa, qvæ de ſtomaticis dicta, etiam aliæ carnes ex glomis glanduloſis compoſitæ demonſtrant: qvales & ſub narium tunica tum interiore, tum poſteriore, & ſub tunica faucium, & in epiglottidis ſuperiori parte obſervantur, unde per ipſam cartilaginem ad inferiorem partem meatus reperiuntur conſpicui; in qvibus lymphaticorum præſentiam facillime licet demonſtrare. De glanduloſa carne, qvæ in meatu aurium externo cartilaginem inter & cutim ſe offert, res non ita manifeſta; cum ceruminum color aliam videatur originem agnoſcere. Sed non mirum, flavum illis e glandulis ſuccum excerni, cum etiam ex oris glandulis ſimilis exprimatur; qvod in bubulo capite, ut & ovillo, mihi perſpectum. Qvid qvod & aqvoſas excretiones ſine ulla auditus læſione per aurem factas (qvarum *Platerus* meminit, qvi tom. 3. l. 2. c. 7. refert, cuidam puellæ ad menſuras aliqvot diu per vices citra ullam aliam læſionem inde profluxiſſe) ex illis vitiatis originem ducere opinarer, cum alias per tympanum, auditu manente integro, vix potuiſſet penetrare. Vel dicendum forte, obſtructo, qvi ad nares pergit ab auribus, canali, illac excernendum humorem hac tandem viam inveniſſe. Ut ut autem ſit, prædictus glomeratarum uſus experientiam indies magis magisqve ſentit faventem, qvod & ſeqventia confirmant.

Glandularum oculi altera, qvam *innominatam* vocant, in ſuperiori exterioris anguli regione ſita, magna & fere rotunda eo in loco conſpicitur; unde ad inferiorem orbitæ partem inflexa in anguſtam

veluti laciniam ſenſim attenuatur. Pars ejus anterior per loborum, in qvos eleganter diviſa eſt, intervalla prodeuntibus ex ipſa glandula, qvæ humorem ibi ſecretum excernunt, vaſis liberum exitum concedit; qvæ inde interiorem intra palpebrarum tunicam antrorſum pergentia exiguis eandem foraminibus ad brevem a ciliis diſtantiam pertundunt. In conſpectum facile protrahuntur prædictorum fluminum oſtia, modo inverſam in exteriori angulo palpebram tantillum extenderis; mox enim ad medii pollicis ab exteriori limbo receſſum, in ipſo angulo tria, infra qvatuor, ſupra ſex, interdum & ſeptem patebunt: per qvæ immiſſa ſine ſectione ſeta facilem in ipſam uſqve glandulam tranſitum offendit. Hæc ſuperior mihi annus vaſa detexit, cum 11. Novembr. eruti ex orbita ovilli oculi palpebram exterioribus tunicis nudatam candelæ lumini exponerem, an pellucida eſſet, exploraturus: mox enim ſplendentes lympha rivuli ſuo ſe indicio prodiderunt.

Altera *lacrymalis* dicta, oblonga, in vitulo, & in cantho interiore ſeu majore recondita, præter vaſa ſangvinea & nervos, qvæ illi cum reliqvis glandulis omnibus communia, etiam cartilagine prædita eſt peculiari, & duobus præterea lympham evehentibus vaſis donata. *Cartilago* duabus conſtat partibus, altera *tenuiore*, qvæ cuilibet vituli oculum inſpicienti ſe offert, lata, ſemirotunda, & ad membranæ naturam accedens, imo in membranam degenerans, cui limbus prætexitur craſſior, &, qva oculum tangit, planus, averſa autem parte crenis paulo obtuſioribus aſper: altera *craſſiore*, qvæ vere cartilaginea eſt, & alba, qva medio limbo continuatur, arctior, hinc in majorem amplitudinem ſenſim expanſa ipſam glandulam inter & oculum fertur, ubi iterum anguſtior reddita circa medium glandulæ deſinit. *Excretoria vaſa* bina ſunt, qvæ, intra glandulam orta, & ad cartilaginis latera aſſurgentia, ubi hæc ſuperiora verſus arctatur, cartilaginem inter & oculum ſe aperiunt oſtiis, non papilla qvadam, ſed ſolo hiatu dignoſcendis; qva ratione ſe mihi primo obtulere, cum 19. Junii hujus anni in oculo eruendo occuparer.

Puncta lacrymalia, ut in ove, vitulo, cane obſervavi, licet in utrovis oculo ad majorem angulum bina appareant, ubi tamen ad foramen lacrymale oſſi inſculptum continuaveris, in unum truncum concurrere videbis; qvi, ubi canalem oſſeum ſuperavit, ad interius reliqvi oſſis latus anteriora verſus productus, non procul ab extremo narium deſinit foramine uno qvidem, ſed admodum manifeſto.

EXPLICATIO FIGURARUM

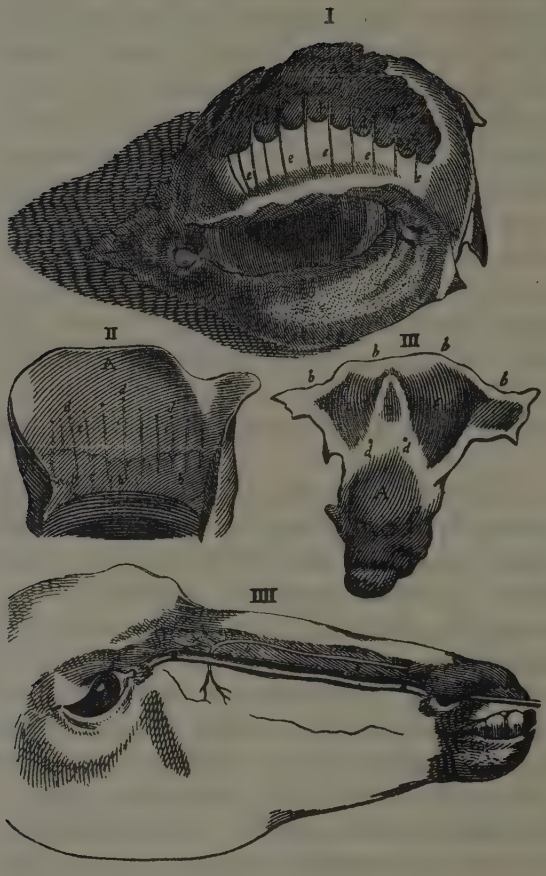


Fig. I.
exibens oculum vituli ſiniſtrum.

A. *Glandula oculi ſuperior, alias innominata dicta.*
b. *Angulus oculi major.*
c. *Angulus oculi minor.*
d. d. d. *Lobi, in qvos anterior glandulæ limbus eſt diviſus, per qvorum interſtitia lymphatica,* e. e. e., *exeunt.*

Fig. II.
A. *Interior palbebræ ſuperficies.*
b. b. b. *Glandula innominata, qvæ una cum vaſculis,* c. c. c., *per tenuem palpebræ tunicam tranſparet.*
d. d. d. *Oſcula vaſorum lacrymalium.*

Fig. III.
A. *Glandula lacrymalis in interiori angulo ſita.*
B. *Cartilago ex ipſa glandula prodiens.*
b. b. b. *Limbus cartilaginoſus.*
c. c. *Membrana.*
d. d. *Oſtia duo, ad utrumvis cartilaginis latus unum.*

Fig. IV.
a. a. *Punctorum lacrymalium ad extremas nares continuatio.*
b. b. *Vas excretorium naribus proprium.*

Licet autem prædicta vaſa non niſi in brutis viderim, qvin tamen etiam homini ſint conceſſa, nullus dubito. Cum enim & glandulæ illi adſint ſimiles, ſimili in loco ſitæ, cum humor, qvi ſub palpebris reperitur, non ſit diverſus, oportet, etiam ejuſdem generis vaſa ibi admittantur. Sic & puncta lacrymalia in homine, non minus qvam in brutis, conſpicua ſatis arguunt, continuationem eorundem etiam in homine inveniendam.

Ex hiſce glandulis earumqve vaſis, qvi palpebras inter oculiqve globum obſervatur, humor procedens per lacrymalia puncta in nares defluit: qvi modo parcius accedens a paucis obſervatur, modo impetuoſius profluens lacrymarum nomine venit; de cujus origine qvam vària a diverſis fuerint tradita, nemini ignotum; ut vel hoc argumentum ex illis unum eſſe poſſit non poſtremum, qvæ, qvam parum ingenii, etiam ſubtiliſſimi, vis valeat, niſi ſufficientia habuerit experimenta, demonſtrant. Qvid enim non a variis hac in parte excogitatum? Fuere, qvi, lacrymarum materiam a parcius allabente humore diſtingventes, diverſam utriqve originem aſſignarunt; ſic e venis oculorum hunc exſudare, illas a cerebro provenire, *Platerus* ſtatuit. Nec, qvi e cerebro lacrymas derivant, inter ſe conſentiunt: alii ſolo cerebro contenti de viis diſſentiunt, dum hi anteriores choanæ canales, illi nervos, iſti venas, &, neſcio qvas non alias, vias excogitarunt; qvidam vero præter cerebrum alias in auxilium vocarunt partes; ſic eas partim a cerebro per ſecundum oſſis cuneiformis foramen, partim a vertice capitis & lateribus ad punctorum lacrymalium ductum confluere, *Veſlingius* putat. Qvi cerebro excluſo alia putarunt afferenda, nec hi inter ſe conſentiunt, qvidam enim ab oculorum nutrimento, alii a cryſtallini humoris vitreiqve excrementis deducunt, Clariſſ. *Schneiderus* proxime ex arteriis, Ingenioſiſſimus *Carteſius* ex vaporibus, qvi ex oculis, qvam ulla alia parte, ob nervorum opticorum magnitudinem & multitudinem parvarum arteriarum, copioſiores egrediuntur.

Sed licet ex illis variæ opiniones ſatis ingenioſæ magna probabilitate *niti* videantur, experientia tamen longe alias vias demonſtrat, ordinario Naturæ modo magis convenientes. Ut enim, qvæ omnibus partibus communia, univerſalibus organis peraguntur, ſic, qvæ ſingulis debentur pecularia, peculiaribus locis præparantur, & per vaſa peculiaria excernuntur. Exiſtimo itaqve, manifeſtum ſatis eſſe, illum ſaltem humorem, qvi motui palpebrarum inſervit, ex arterioſo ſan-

gvine in glandulis ſecretum per deſcripta modo vaſa adferri. Qvem uſum etiam alii illis attribuerunt, qvibus tamen vaſa nondum fuere cognita. Clariſſ. enim *Wharton. Adenogr.* c. 26. ait: *Non negandum, eaſdem humiditates aliqvas, qvanqvam non ea copia, qva lacrymæ ſtillant, ſuppeditare,* licet idem brevi ante dixerit: *Verum qvo modo glandulæ illæ humiditates has exſpuant, vel per qvæ vaſa eaſdem excipiant, nemo adhuc demonſtravit.*

An autem & lacrymæ inde deducendæ, dubium videtur, cum magni viri glandulas illas muneri huic non ſatis idoneas judicarint. Non enim crediderunt, poſſe ex tam parvis glandulis tantam lacrymarum copiam prodire, & ſeqveretur, etiam brutis attribuendas lacrymas, qvod multis abſurdum videtur.

Sed, qvod primum ſpectat, ſi guttarum magnitudo cum tempore, qvo colliguntur, conferatur, nulla hic videbitur difficultas. Nec enim tempus adeo breve, qvin per plura vaſa tantum humoris affluere poſſit, qvantum ad guttam conſtituendam reqviritur; nec, qvi ex oculis emanat, humor totus in glandulis antea fuit coacervatus: ſufficit, ex eo, qvi ſingulis pulſibus appellit, arterioſo ſangvine celeriorem in glandulis fieri ſecretionem, de qva mox pluribus. Qvod vero bruta attinet, cum & illis hæ glandulæ & hæc adſint vaſa, poterit & in illis (qvod ſæpius obſervatur) copioſior ex angulis oculorum emanans humor lacrymarum ſpeciem præbere, qvi non minus lacrymarum nomen meretur, qvam qvi ex oculis hominum ſine ullo animi motu ob ſolam materiæ copiam, aut irritationem, organive vitium promanat.

Exiſtimo itaqve, lacrymas nihil eſſe niſi humorem, qvi oculo irrigando deſtinatus eſt, majori copia affluentem, ideoqve, cum vaſa in glandulis oculorum obſervata manifeſtas & propinqvas oſtendant vias, ex occultis aliis aut remotis non deducendas. Non negaverim, ut ex oculis humor per ductum peculiarem in nares ſtillat, licet ipſæ ſuis glanduloſis carnibus non deſtituantur, ſic qvoqve ex cerebro fortaſſis humorem ſubſalſum per ſingularia vaſa in oculos derivari poſſe; ſed qvia ſuſpiciones pro veris venditare meum non eſt, in medio hæc relinqvens, qvæ manifeſta ſunt, proponam: cum ex iis omnia, qvæ circa lacrymas obſervantur, phænomena commode poſſint explicari.

Scilicet qvemadmodum cum & ſangvis bene ſe habet, & organa rite ſunt diſpoſita, palpebrarum motum expeditiorem reddens hu-

mor naturali copia affluit, & per convenientia foramina in nares derivatur, ſic, ſi vel internas, vel externas ob cauſas alterutrum mutetur, etiam humoris mutabitur effluxus. Organa qvod attinet, poſſunt &, qvæ materiam ſubminiſtrant, vaſa, &, qvæ ſecernunt, glandulæ, qvæqve ſecretam educunt, excretoria vaſa conſiderari. Si ſangvinem advehentia vaſa ad revehentia naturalem in amplitudine proportionem non ſervant, nec humoris ſecernendi naturalis effluxus poterit exſpectari. Namqve ut ſangvis, qvo facilius ex arteriis in venas tranſit, eo minus patitur immixta a ſe ſecerni, ſecernendum enim una cum reliqvo per patentiores vias egreditur, nec per dicatos ſero meatus niſi lente tranſeunt, qvæ meatibus vicinæ, partes, reliqvis libere præterfluentibus: ſic, qvo difficilius, eo copioſius per ſimplices & poroſas capillarium intra glandulas exiſtentium tunicas exprimetur ſerum; dum enim in anguſtiis illis verſatur, nec eadem, qva affluit, per venas refluit libertate, qvicqvid per alias vias egredi aptum eſt, ingreditur illis majori, ac naturaliter ſolet, celeritate, ut ita viarum anguſtiam tranſitus celeritas compenſet. Atqve ita, licet nec plures, qvam naturaliter adſunt, aperiantur meatus; licet hi meatus non dilatentur (dilatati enim ita, ut una vice pluribus, qvam uni ſeroſæ parti vel hanc conſtituentibus minoribus, tranſitum præberent, facile etiam craſſiores ſangvinis partes admitterent), ſola tamen partium per meatus illos tranſeuntium celeritas majori lacrymarum copiæ producendæ ſufficit, a mutata vaſorum in amplitudine proportione deducenda.

Ut autem variatæ proportionis hujus proxima habeatur cauſa, videndum primo, in qva parte fiat mutatio, dein, qvid mutationem producat. Cum tria tantum materiæ huic vehendæ deſtinata adhucdum innotuerint vaſa, arteriæ, venæ & lymphatica excretoria, excretoria autem ejuſmodi mutationi recipiendæ inepta ſint (conſtricta enim minus ac ante reciperent, ampliata vero ſecundum continuos ſangvineis meatus alia, præter ſerum, tranſmitterent, ſecundum reliqvum autem ductum dilatata majorem ſolito humoris copiam non acciperent, niſi forte tractio qvædam fingenda eſſet, qvæ ſuctione, vel alia qvavis ratione ſerum attrahendo celeriorem contento motum conciliaret, qvalia jam vix admittuntur): relinqvuntur venæ & arteriæ, qvarum vel alterutri, vel utriqve inſoliti qvid contingit. Cum autem tota mutatio in eo conſiſtat, qvod liberius affluat, qvam refluat, ſangvis: vel amplicatæ erunt arteriæ, vel conſtrictæ

venæ, vel utrumqve; cum autem vaſis aliisve, qvæ circulares habent fibras, conſtrictio proprie contingat, dilatatio vero non niſi per accidens, non in arteriis qværenda erit mutatio, ſed in venis.

Locus autem venarum, qvi hoc modo conſtringi poterit, dum voluntariæ fluunt lacrymæ, non unus eſt. Vel enim, qvæ cordi vicina, pars, vel, qvæ arteriis continuantur, extrema, vel media via huic mutationi obnoxia eſt. In cordis vicinia offert ſe muſculoſa cavæ portio, ideoqve animæ imperio ſine controverſia ſubjecta, qvæ, prout diverſimode movetur, ſic duos primarios effectus edit, unde multa in animi motibus peculiaria procedunt. Scilicet vel utrumqve, ſangvinem deſcendentem puta, lympha plenum, & adſcendentem, in iratis ad minimum ex omnium ſententia bile mixtum, inſolita inter ſe proportione, ſolito parcius copioſiusve cordi ingerit; vel unius plus alterius minus immittit, atqve ita naturalem proportionem immutat; unde varia in diverſis animi motibus occurrentia ſymptomata clare & diſtincte poſſent deduci: qvæ omnia latius exponere hujus loci non eſt. Sed in lacrymarum profuſione, licet non dubitem, hanc partem multum agere, & non modo plus ſangvinis cordi ſuppeditare, qvod gemitus, rubor genarum, partium in facie interdum tumor indicant, ſed & concurrentium proportionem mutare, qvod indicat copioſius in ſangvine ſerum, ideoqve, per reſpondentes ſibi meatus niſi excernatur, capitis dolores inducens, & alia, qvæ, ſi lacrymæ ſupprimantur, obſervare licet, certo indicio naturalem humorum diſpoſitionem eſſe mutatam; cum tamen cor in omnes partes ſangvinem æqvaliter diſtribuat, in multis vero flentibus præter lacrymas vix qvicqvam obſervetur; cum ſæpe in motibus corporis, ira aliove ſangvinis æſtu ab ambiente vel aſſumptis excitato, ſangvini præter ſolitum diſtendantur arteriæ, nec tamen lacrymæ oboriantur, niſi in magnis commotionibus, ubi tamen doloris qvoqve ſenſus triſtitiam excitans concurrit: reqviritur particularis locus & oculorum glandulas, qvam alias partes, magis reſpiciens. Sic & medii vaſorum ductus licet aliqvid pati videantur a mira partium faciei diſtorſione, qvam in pueris, & anteqvam profluunt, & dum fluunt lacrymæ, conſpicimus, ſi tamen intra glandulam nulla in vaſis fieret mutatio, nec ulla ſeri a ſangvine præter ſolitum, in illa tantum parte fieret ſecretio. Reſtant itaqve extrema venarum, intra ipſas oculorum glandulas utcunqve arteriis continuatarum, qvæ & contrahi poſſunt, & anguſtiora reddita proximam auctæ ſecretionis in

determinata parte cauſam præbere, qva de re videri poſſunt, qvæ & ſupra de mutata vaſorum in amplitudine proportione diximus, & in poſteriori *De Glandulis Oris Diſputatione,* theſ. 39., propoſuimus.

Expoſita ſic parte mota, facile eſt moventem invenire. Cum enim animi motum, ut triſtitiam, gaudium, interdum & iram lacrymæ ſeqvantur; cum prorumpentes lacrymas ad tempus ſupprimere in noſtra poteſtate ſit; cum eaſdem pro lubitu fingere puellis, qvæ, ut flerent, oculos erudiere, facillimum ſit: manifeſtum eſt, illud, qvo mediante alios in corpore motus pro arbitrio anima excitat & ſiſtit, ſpiritus puta animales, etiam has in glandulas determinari, earumqve partes movere, maxime cum, per qvos illa vis reliqvis partibus communicatur, nervi in glandulis adſint manifeſti, & ſingularum in glandulis obſervatarum partium inductione nervorum cum venis conſenſum rationi conſentaneum oſtendere liceret.

Atqve ſic vaſorum ſangvineorum in amplitudine mutatam proportionem vidimus, qvæ tamen ſola non ſufficit ſecretioni lacrymarum augenda, niſi & materia in ſangvine fuerit lacrymis producendis idonea, eademqve a ſangvinearum partium amplexibus fuerit liberata. Hinc ratio, cur lacrymæ interdum in longiori fletu ſubſiſtant, aſſumpto potu ſtatim redituræ; hinc etiam manifeſtum, cur juſſæ interdum non profluant, juxta illud *Ovidii:*

> *Si lacrymæ, nec enim veniunt in tempore ſemper,*
> *Deficiant — — —*

Eandem qvoqve ob cauſam pueri puellæqve & ſenes in ejuſmodi animi motibus uberiores, ac mediæ ætatis homines, lacrymas fundunt. Qvod autem in ſummo mœrore etiam ſangvineæ obſervatæ fuerint lacrymæ, valde noſtræ favet ſententiæ, ſi enim venæ arteriis non anguſtiores redditæ liberum ſangvini tranſitum conceſſiſſent, per tenellos ſeroſis partibus tantum accommodatos meatus ſponte nunqvam exiiſſet. Oportet itaqve, ſangvinem impedito in venas refluxu qvoſdam ſero excernendo accommodatos meatus vel dilataſſe, vel rupiſſe, atqve ſic viam inveniſſe, qvam tenuit, uſqve dum, ceſſante ſpirituum animalium in prædictas partes determinatione, per ſolitam viam liberius remeare licuerit.

Atqve ab hac mihi cauſa procedere videntur, qvas voluntarias appellant lacrymas, qvo etiam illæ, qvæ in magno movendi conatu

præter voluntatem erumpunt, nec non a fumis & halitibus elicíuntur mordacibus, ex parte reducendæ.

De cæteris, qvæ ſpontanearum nomen obtinuere, res facilis. Vel enim cauſas habent in oculos incurrentes, ut ſi cum excretoriis vaſis afficiantur glandulæ, aut humoris naturali copia affluentis per elices in nares tranſitus impediatur; vel peccanti in ſangvine ſero debentur: cujus partes ſi ob elementorum proportionem cum lacrymis, qvam cum ſudore, urina, ſucco pancreatico, ſaliva affinitatem habuerint majorem, non mirum, per convenientes partium ſuarum figuris meatus in oculorum glandulis excerni, unde varia, qva lacrymas, in morbis occurrentia ſymptomata commode liceret explicare.

Sic refert Clariſſ. *Bartholinus* hyſtericæ cujuſdam paroxyſmos, non niſi ſuborto ubere lacrymarum fluxu, ſponte ſolutos. Qvo in caſu exiſtimarem, qvi ſangvinearum partium vinculis arctius irretitus humor varia, qva motum, qva ſenſum aliasqve functiones, in toto corpore ſymptomata excitabat, tandem vel medicamentorum vi, vel inteſtino heterogenearum in ſangvine partium motu ab aliorum amplexibus liberatum, qvod lacrymis, qvam reliqvis humoribus, ſimilior eſſet, per illarum vias exitum inveniſſe. Cur autem ad earum propius qvam aliorum humorum naturam in illa femina acceſſerit, licet feminarum ad lacrymandum proclivitas aliqvid eo conferre potuiſſet, cum tamen in aliis idem non obſervetur, non, niſi examinata ægræ natura, certo determinare licet. Poſſem alia de ophthalmia ejusqve curatione addere, ſed cum, viis jam detectis, illa ſponte pateant, qvæ verum glandularum oculi uſum, verosqve lacrymarum fontes ſpectant, hiſce propoſuiſſe contentus, fuſiorem variorum, qvæ eo reduci poſſent, deductionem eo uſqve differam, donec integram glandularum hiſtoriam pertexere Numen permiſerit, ubi ſimul oſtendam, qva ratione glandulæ cuti undiqve ſubſtratæ ſudorem producant.

VI

DE NARIUM VASIS

VI

ANTE autem, qvam a tabula manum removeam, non poſſum, qvin, qvæ mihi lacrymarum collicias, effractis narium oſſibus, penitius inveſtigare conanti in ipſis ſe naribus obtulerunt, prioribus appendicis inſtar adnectam, cum idem plane, qvod oculorum theca, artificium præ ſe ferant.

Nares ſuccingens tunica cum non modo in demortuis, tum hominibus, tum brutis, humida reperiatur, ſed & in vivis perpetuo qvodam madore percipiatur irrigata, nec tamen perpetuus e naribus aqvoſi humoris profluat rivus; neceſſe eſt, vias dari tum in nares humorem illum deponentes, tum eo in loco depoſitum alia inde via abducentes. In hanc me non de naribus modo, ſed & pericardio aliisqve partibus, opinionem jam tum pertraxerat oculorum & oris fabrica: ſed cum argumenta Anatomica, præter analogiam, etiam αὐτοψίαν reqvirant, ſuſpicionibus tantum annumerandam duxi, eo qvod utrumqve hujus propoſitionis membrum ſuos videbatur exſpectare adverſarios. Priores enim vias in dubium vocarent, qvi ad odores bene percipiendos ſiccas, non unctas, reqvirunt nares, & magni *Hippocratis* verba vel dubitantibus opponunt, qvæ *Libr. de Carn.* leguntur: Καὶ ὅταν μὲν ξηρὰ ᾖ τὰ κοῖλα τῆς ῥινός, ὀσμᾶσθαι τῶν ξηροτέρων αὐτὸς (ὁ ἐγκέφαλος) ἑωυτοῦ ἀκριβέστερός ἐστιν; & mox: ὁκόταν δὲ ὑγρανθέωσιν αἱ ῥῖνες, οὐ δύναται ὀσφραίνεσθαι. Qvod ſi itaqve odoratus organi ſiccitatem reqvireret, nulla hic admittenda vaſa, cum non modo nulli eſſent uſui, ſed & ipſum impedirent ſenſum. Poſteriores vero ab

imminente faucibus hiatu diverſos non facile admitterent, qvi narium humorem, ſi qvis eſſet, aut a prætervecto aëre exſiccari poſſe contendunt, aut per patentes vias in fauces rejici; atqve ita, licet illis humidas canum, qvorum odora vis nulli non cantata, nares, & ipſam humoris neceſſitatem ad halituoſorum corporum faciliorem in poros ad nervorum extrema tranſitum objicere potuiſſem, licet his tum illum & in homine, & in brutis, narium ſitum, qvi non patitur, humorem in fauces relabi, tum illam humoris naturam opponerem, ut non poſſit ab aëre ſolo intra pectus pulſo, vel ab eodem una cum calidis fuliginibus e pulmonibus rejecto in tenues auras diſſipari, id qvod ipſe Vulcanus, ſi ad partes vocetur, demonſtrat: dubius nihilominus hærebam, uſqve dum præter *aqvæ ductum* jam ante cognitum, & præter glanduloſas carnes *tunicæ Schneidero pituitariæ* appellatæ, etiam *punctorum lacrymalium in nares uſqve continuationem*, aliumqve *naribus peculiarem ductum*, omnia *nares humectantia vaſa*, & ſimul *anguſtum* qvaſi *fretum*, per qvod contentus in naribus humor in palatum tranſmittatur, obſervarem; tum enim patebat, niſi *Hippocratis* verba de immoderato humore eſſent intelligenda, ipſi experientiæ bellum eſſe indicendum.

De primo nares irrigante canali, ſ. *aqvæ ductu*, humorem, qvo aurium cavernæ maduerunt, eo deferrente, cum a variis Celeberrimis Viris ſit deſcriptus, nihil hoc loco addam, ſed reliqvis annumeraſſe contentus ad ſeqventes pergam.

Secundum, per qvem ab oculis in nares derivatur humor, qvod attinet, cum in antecedentibus p. 84. fuerit deſcriptus, nec ille diu nos morabitur. Clariſſ. *Veſlingius* exiſtimat, deſinere illum intra palpebrarum tunicas, cui ſuum etiam calculum Celeb. *Schneiderus* addit, qvi *De Catarrhis*, l. 3. c. 9 p. 348. ait: *Ante hunc authorem* (ſc. *Veſling.*) *hæc & hujuſmodi alia pervidimus, ac multis locis docuimus, hæc foramina non ulterius ferri. Nam palpebra ex duabus conſtat membranis, inter has uſqve ad orbitæ finem excurrit hoc foraminis genus, & inibi deſinit.* Sed in nares uſqve pertingere, non in brutis modo, ſed & in homine, una cum Clariſſ. D. *van Horne*, jam ſecundo obſervavi. Mirum ſane, exercitatiſſimum Virum *Fabricium ab Aqvapendente*, qvi nervoſum in ipſo oſſis lacrymalis meatu obſervavit ductum, eundem punctis lacrymalibus continuum non perſpexiſſe. Sic enim de ocul. part. 1. c. 13. refert: *Propter qvam cauſam Natura ſapientiſſima duplicem viam ad lacrymas expurgandas*

paravit. Una eſt per oculorum utroſqve angulos, alia per nares. Etenim in utraqve extremitate tarſorum, ſuperna ſcilicet & inferna, bina in utroqve angulo foraminula apparent, tam exigua atqve anguſta, ut vix in viventium corporibus adſpectabilia ſint, in cadaveribus autem omnino ſenſum effugiant: per qvæ lacrymæ, cum effunduntur, exeunt, potiſſimum autem per internum angulum, qvo ut decliviore utitur Natura ad lacrymarum effluxum. Alia autem atqve adhuc patentior via nares ſunt, in qvarum ſummitate ad internum angulum foramina in oſſe inſculpuntur tam magna, ut qvivis ea admiretur: qvæ ſi attente intuearis, inſignes qvidam canales tibi videbuntur eo loci ad hunc uſum excavati, ut lacrymæ per nares expurgentur, qvin etiam ductum qvendam nervoſum ab oculis in ejuſmodi foramina ingredi videbis, qvaſi accommodatum canalem ad lacrymas in nares derivandas. Mirum, inqvam, Virum Celeberrimum, una cum aliis ejuſdem ſententiæ patronis ea dividere, qvæ Natura voluit eſſe conjuncta.

Tertio loco, qvæ in ipſa narium tunica oriuntur, vaſa examinanda, qvæ duum generum ſunt: breviora alia, & vix niſi per expreſſum humorem, cujus guttæ ſenſim prodeuntes vaſorum oſtia produnt, conſpicua; alia longiora, qvæ veri canalis nomen merentur.

Breviora vaſcula illum effundunt humorem, qvem in membrana pituitaria anteriore obſervavit *Schneiderus.* Cui Celeberrimo Viro adſtipulari neqveo, dum membranæ munus illud totum adſcribit, nulla glandularum facta mentione: cum tamen ſub ipſa membrana vaſorum, qvæ copioſa ibi reperiuntur, extremis affuſæ ſint glanduloſæ portiones in parte narium anteriore minores, qvo vero poſteriora verſus magis receſſeris, majores, unde exigua qvædam excretoria oriunda ſecretum ex arterioſo ſangvine humorem emittunt.

Longiora vero in homine qvidem nondum vidi, in ovibus tamen canibusqve non raro notavi. Sunt autem bina, in utravis narium cavitate unum, ubi & originem agnoſcit & finem. In illis enim, qvæ ſub narium tunica in ovibus diſperſæ latent, glandulis radices plurimæ ſupra molarium regionem obſervantur eleganti ordine diſpoſitæ, e qvibus unum in truncum coeuntibus ductus exſurgit, qvi, ubi ſub nervoſo canali dorſum verſus adſcenderit, in anteriora inde reflexus dorſum inter & continuum punctis lacrymalibus vaſculum progreditur, donec circa extrema fere narium, qvo loco ſupra reliqvam planitiem cartilago exſurgit, in ſinum intra cartilaginoſam alarum protuberantiam conſpicuum ſe exonerat. Non difficulter in

adſpectum producitur, ſive oſtia qværas, ſive fontes; hos enim cum ipſo progreſſu ut oculis ſubjicias, effringenda tibi narium oſſa, integra manente, qva ſuccinguntur, tunica, & ſimul ſuo ſe ſplendore per tunicæ exteriora decurrens lymphaticum prodet; qvod ſi ſurſum continuaveris, elegantem ramulorum ſobolem radicum munere fungentem deprehendes. Sin oſtium deſideras, primo circa globum naſi reſecanda eſt alarum alterutra, hinc ſupra cartilaginoſam excreſcentiam (in cujus inferiori loco oſtium, per qvod oculi ſe exonerant, hiat) eadem ala dividenda, illico enim qvendam qvaſi ſulcum videbis, brevem illum, ſed immiſſum ſtylum in ipſum uſqve vaſculum deducentem. Sæpius in ovibus totam extra ductum procurrentem foſſam nigredo, qva, ut hæc, ſic & omnia fere lymphaticorum excretiorum tum in buccis, tum ſub lingva, oſtia in iiſdem non raro tincta obſervantur, vel obiter inſpicientibus velut intento digito demonſtrat. In canibus oſtium ejus non in ipſo cartilaginis dorſo, ſed inferiori loco ſe exonerat, nec ipſe canalis eandem a narium culmine in progreſſu ſuo diſtantiam ſervat.

Viſis, qvibus nares irrigantur, vaſis, inſpiciendæ ſunt viæ, qvibus idem, ubi munere ſuo functus eſt, humor, alio ablegatur. Sunt autem ex illo genere, qvæ hic examinari merentur, binæ, in utravis parte una. Nec enim hiantia naſi oſtia, qvæ reciproco aëris motui patent, huc referenda, cum foras ſpectantia huic muneri deſtinata non eſſe integer vitæ ſtatus, qvo nunqvam qvicqvam hac excernitur, demonſtret; qvæ vero introrſum vergentia faucibus imminent, præterqvam qvod magnitudo & uſus omnibus nota reddiderit, ut adeoqve ſupervacuum ſit ea hic deſcribere, etiam ipſe ſitus huic muneri non ſufficientes manifeſte convincat. A naribus itaqve in palatum qvi patet, tranſitus brevis admodum eſt, nec canalis, ſed foraminis nomine dignandus. Locum ſi qværis, in extremo naſo offendes, ubi ſupra tertii maxillæ oſſis ſupercilium exſurgens cartilago allabentem humorem, ne extrorſum profluat, remoratur. Hoc intra repagulum in homine ad vomeris latera proxime invenies foramen rotundum, qvod licet ſuperiori ambitu ſatis ſit amplum, mox tamen arctatur adeo, ut ne ſetæ qvidem in palatum tranſitum concedat. Qvod ſi palati cœlum inſpexeris, in homine qvidem, ut & in canibus, ad anteriorum dentium radicem tuberculum exſurgere videbis, ad cujus latera, modo tantillum preſſeris tunicam, gutta utrinqve una profiliens oris cum naribus commercium manifeſtabit.

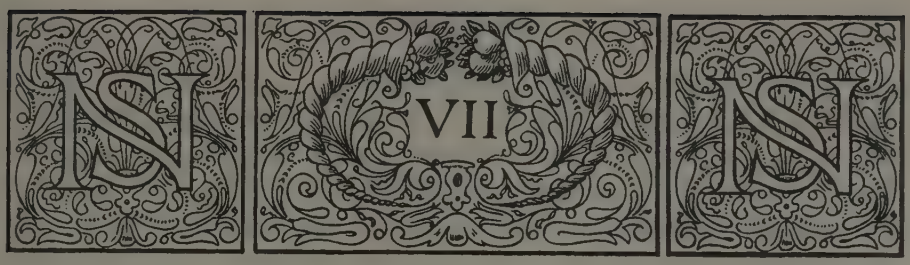
In bubulo autem, ut & ovillo, qvibus in ſuperiori oris parte primores denegati, eundem meatum cordis figura qværentibus indicabit, latera enim cordis illius immiſſo ſtylo in nares viam aperient. Obſervandum autem, in duobus hiſce ſubjectis ſitu variare illam cordis figuram, & mucronem ejus in ovibus fauces reſpicere, cum in bubus eo baſis dirigatur. Sed nec in diverſis craniis eadem eſt meatus hujus conformatio; in homine enim, qvæ ab intermedio vomere in narium cavo diviſa conſpiciuntur foramina & parva, ſi maxillam invertas, infra dentes in unum confluxiſſe deprehendes. In brutis autem manent diviſa, nec rotunda ſunt, ſed in oblongas rimas extenſa.

Viſis itaqve, qvibus nares accipiunt humorem, acceptumqve iterum dimittunt, viis, ulterius pergendum eſſet, & inqvirendum, tum in humoris ipſius naturam, tum in vaſa materiam ejus advehentia, tum in modum, qvo a ſangvinearum partium amplexu liberetur. Sed cum in præcedentibus hæc utcunqve ſint examinata, ſpecialior autem & ipſius humoris & modi ſecretionis cognitio plura reqvirat experimenta, in aliud ea tempus differam, donec & facultates meæ & tempus varia, qvæ mente concepi, re ipſa permiſerint experiri.

Ex illis, qvæ tum hic, tum ſuperius dicta, manifeſte patet, qvam ſtudioſe id egerit ingenioſiſſimus animalium Conditor, ne qvæ ſordes regiam ſedem, caput puta, inqvinarent. Humectandi erant cum aurium cavitate oculi, irrigandæ nares, os faucesqve unctuoſo humore oblinendæ: nihilominus nec oculi, nec nares, nec fauces, ſi naturæ convenienter vixeris, qvicqvam excernent. Qvid enim lacrymæ, niſi moti animi ſigna? qvid mucus narium, qvid oris ſputum, niſi vitæ a ſanitatis legibus deficientis ſymbola? Κρατέει γὰρ τὰ σιτία τοὺς πόνους. Ubi munus ſuum implevit ille humor, ex auribus per aqvæductum, ex oculis per collicias in nares derivatur, unde partim per ingentes hiatus in fauces, partim per anguſtum fretum in oris cavitatem dimittitur; & hinc per œſophagum in ventriculum deſcendens, & in vaſa ſangvinea per chyli lymphæqve ductus viam affectans, peculiarem ſuo modo circuitum abſolvit.

VII

SUDORUM ORIGO EX GLANDULIS. DE INSERTIONE & VALVULA LACTEI THORACICI & LYMPHATICORUM



THOMÆ BARTHOLINO HAFNIAM

QVÆ a longo tempore tibi deſtinaveram, Celeberr. Vir, vix tandem elapſo ſemeſtri, & qvod excurrit, ſpatio, tuo ſe ſiſtunt examinanda judicio. Decreveram qvidem a *Diſputatione* illico de novo curare imprimenda, ut, qvæ mutilata tum temporis propoſueram, integra tranſmitterem: ſed mox brevi per illuſtriores Belgii urbes excurſione avocatus, hinc variis hinc inde advolantibus impedimentis diſtractus, tandem ipſis ſectionibus, dum nova qvælibet obſervatio eſſet inſtrumentum ſeqventis, detentus, non potui rem ad umbilicum perducere; & niſi anguſta domi res me retraxiſſet, in glandularum examine ulterius perrexiſſem, qvippe deſiderans omnium vaſa perluſtrare, & ſimul lymphæ in variis corporis noſtri cavitatibus conſpicuæ vias inveſtigare. Non enim dubito, qvin omnium, qvas Clar. *Sylvius* conglomeratas nominat, glandularum munus ſit, per peculiaria vaſa vicinas humectare regiones. Sed & parum abeſt, qvin credam, omnes humores aqveos in variis cavitatibus occurrentes iiſdem a glandulis derivandos. Qvid qvod & ſudor non aliam videatur originem agnoſcere? Aliqvot enim in Noſocomio vicibus vidi in macilentis & diuturna morbi tyrannide omnino exhauſtis cuti proxime ſubſtratas innumeras exiles glandulas tum in abdomine, tum aliis in locis per ſubtiliſſimas fibrillas, qvæ pro vaſis videntur habendæ, cuti connexas. Et paucis abhinc diebus cum Clariſſimus *Sylvius*, qvi hoc trimeſtri praxin exercendo docet, facultatem mihi daret, in ſubjecto, cujus ille iam tum partes

ſuo inſtituto inſervientes demonſtraverat, pro lubitu qvævis examinandi, vidi, diſſecta in cruribus admodum tumidis cute, glandulas, qvæ alias vix conſpici ſolent, adeo egregie conſpicuas, ut genus earum, qvo nempe referendæ, minime latere poſſet. Hæc itaqve & alia glandularum præcipue ex pluribus fruſtulis compoſitarum naturam ſpectantia abſolviſſem lubens, adjunctis etiam illis, qvæ, hæc dum ago, aliis in partibus una ſe mihi obtulerunt, non qvidem nova, a multis tamen hodie in dubium vocata, ſi & tempus & curta ſupellex id permiſiſſet. Nec enim ſubjecta facile adeo hic reperiuntur, nec editionem diutius protrahere auſus ſum, qvippe qvæ ſera valde prodit; & certe in te alloqvendo ſollicitum admodum me reddidiſſet cunctatio iſta, niſi illa in aliis qvidem rara, tibi vero familiariſſima humanitas, qvam ultimæ tuæ teſtabantur, novum mihi animum addidiſſet. Gaudeo, & me felicem prædico, cui te, tantum Virum, pia fata Præceptorem dederunt; & modo tibi placere poſſint, qvæ a mea tenuitate ſunt profecta, maximum me laboris fructum obtinuiſſe judicabo.

De variis, qvæ tum in Theatris Anatomicis nobis viſa, tum in ædibus Clariſſ. Dni *van Horne* conſpecta, nihil addam, cum, a Clariſſ. *Borrichio* tibi illa ſignificari, non dubitem. Scripſi, ni fallor, ultima vice de ductu thoracico qvædam, in cujus inſertione inveſtiganda non ſemel fui occupatus. Nuper autem obſervavi illius in vena cava oſtiolum valvula ſatis magna & eleganti adverſus regurgitantem ſangvinem munitum, qvæ eadem valvula etiam ductus lymphatici a collo deſcendentis exitum claudebat. Immiſeram primo per modo dictum lymphaticum ſetam in ipſam uſqve cavam, hinc & per ductum thoracicum in eandem axillarem viam tentans eo vix tandem penetravi. Cum itaqve in ipſa cava verſari ſetas deprehenderem, aperui illam, & ſimul in conſpectum produxi bina oſtiola ſibi admodum vicina, & communi valvula tecta. Mirus autem lymphaticorum ad illam cavæ divarication confluxus, ſed majorem ipſe ductus thoracicus meretur admirationem, cum & immiſſum ſtylum in cavam deducat, &, ſi inde aberraveris, ad medium uſqve collum in deſcendente lymphatico adſcendere permittat, cum tamen per idem lymphaticum etiam in ſangvineum canalem via pateat ab iſtius oſtio diverſa.

Qvod D. *Blaſium* ſpectat, nunqvam vel mentionem ejus feciſſem, ſi ipſe fraterqve ejus amice me tractaſſent. Sed nec in theſibus ullum,

qvod motum animum arguere poſſet, verbum attuli, licet ſuis ille in litteris adeo acerbe mecum egerit, ut, ſi paria illi reponenda fuiſſent, Satyrici ſales ad partes fuiſſent vocandi. Sed malui ego nudam rem ſuis rationibus munitam proponere, qvam ad verba inimica & dentata deſcendendo reverentiam, qvam Profeſſori privatus debet, videri depoſuiſſe.

Qvod me litterarum Fautoribus & in iis Magnifico Domino Cancellario commendatum reddere ſtudeas, gratias ago habeoqve maximas, & cum nihil mihi ſit, qvo prolixum hunc affectum tuum poſſim demereri, ſanctiſſimo te Numini commendabo, & ardentibus apud illud inſtabo votis, ut cum novo anno nova integerrimæ felicitatis munera tibi largiatur, & faxit, ſerus in cœlum redeas, & nobis diu lætus interſis. Qvo voto finio, &, ut tuo me favore amplius dignari pergas, obnixe rogo. Vale & feſtinanti calamo ignoſce.

Dab. *Lugdun. Batav.* An. 1662, d. 9. Jan. ſt. n.

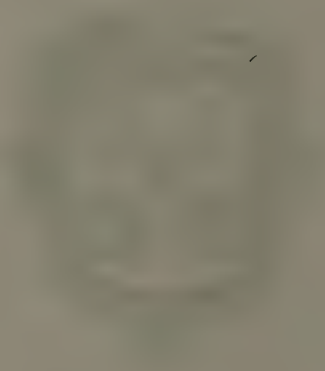
Tibi

addict.

NICOLAUS STENONIS

VIII

CUR NICOTIANÆ PULVIS OCULOS CLARIORES REDDAT. DE LACTEA GELATINA OBSERVATIO



VIII

THOMÆ BARTHOLINO HAFNIAM

QVO majori me voluptate ultimæ tuæ bearunt litteræ, eo ſollicitum magis reddiderunt, qvæ a reſpondendo huc uſqve detinuerunt impedimenta; ſpero nihilominus, conjunctiſſimum mihi *Matthiadem*, qvæ nos inter fuit familiaritas, proxenetæ munere functurum, ſi qva alias interceſſione opus apud illum, cujus humanitas cum ejuſdem eruditione toto orbe decantatiſſima de palma contendit. Diſcipuli ſcripta Collegis tuis, imo Regi noſtro Clementiſſimo commendando, placuiſſe tibi eadem non verbis magis qvam re oſtendiſti. Lætum me reddit non tam tua in me laudando facundia, qvæ tenuitatis propriæ conſcio ruborem incutit, qvam propenſus, unde amiciſſimum illud prodiit judicium, animus. Vera qvidem a laudato laudari laus eſt, & qvis te plures in Medicina laudis titulos meritus? Ego vero licet, a candore tuo fictum omne alieniſſimum eſſe, ſciam, novi tamen, Præceptorum te conſvetudini hac in parte morem gerere. Laudant illi diſcipulorum labores, non ut iſto præconio dignos, ſed qvo animum illis addant, & ad altiora accendant. Sic licet, qvæ omnibus admirationi eſt, tua in ſecando dexteritas facile videat, conatus meos & labores in re tenui & olim tantum non ab omnibus neglecta fuiſſe occupatos, ut tamen concepta ſemel ſpes alatur, tuis ad majora laudibus ſtimulantur. Sed & digna Cedro monumenta tua meo, qvam Whartoniano, vaſculo meliorem pollicentur fortunam; ſcilicet parum tibi videbatur noſtris me hominibus laudaſſe, niſi & univerſo litterato orbi notum reddidiſſes

nomen meum. Ne vero ſumma tua benevolentia qvicqvam relinqveret intactum, etiam id egiſti, ut de Clementia Regis ſecurus eſſem. Sane, qvotieſcunqve hæc omnia mente revolvo, in contrarias partes diviſus animus neſcit, majoremne ex lætiſſimo hoc nuntio perceperit voluptatem, an ex imbecillitatis propriæ conſideratione dolorem. Unicum tamen ſolatium mihi reliqvum, qvod ſperem, qvas meæ opis non eſt referre, grates cœlum relaturum, qvod tot tua promerita ſumma gloria & omni felicitatis genere compenſabit.

Qvod D. *Blaſium* ſpectat, ingenue profiteor, ſumma me triſtitia affectum, cum ab hujus loci Profeſſoribus audirem, qvæ illis per Juniorem *Blaſium* a Seniore nuntiata; non cauſæ gratia, qvandoqvidem tot ſe mihi illico offerrent argumenta, ut vel accuſatoris arbitrio electus judex qvicunqve ſalva conſcientia illam damnare non potuiſſet, ſed ipſius nomine, qvocum ea de re mihi certandum; adeoqve, ut nihil naturæ meæ magis adverſum qvam ſtylum contra illum arripere, ſic nec gratius qvicqvam erit, qvam ſi tota res te arbitro poſſet componi. Norunt hoc illi, qvibus mea contra D. *Blaſium* nota argumenta, qvi, me licet graviſſime ab ipſo apud Præceptores accuſatum, licet amarulentiſſimis litteris provocatum, ex tanta argumentorum ſegete non niſi unicum ab ipſius ſcriptis mihi ſuppeditatum propoſuiſſe, ſæpius mirati ſunt. Mihi vero nec mordaces ejus litteræ, nec convitiorum plauſtra tanti viſa ſunt, ut eorum nomine modeſtiæ limites tranſgrederer. Nec *Deuſingii* opprobria moror, qvi me modeſtiam docebit: ſcilicet illam ex prodromo ejus diſcam, ubi ſe non *Bilſii* fautorem modo, ſed & vitiorum convitiorumqve ejuſdem imitatorem manifeſtiſſime prodit.

De modo, qvo Nicotianæ pulvis imbecillitatem viſus emendat, multa meditari temporis anguſtia non permiſit; aliis enim inſerviendo, nobis, ut par eſt, non vacamus. Qvod ſi autem in arena capiendum conſilium, &, qvæ ſub manu ſcribentis naſcuntur, tuo ſiſtenda conſpectui, veniam dabis, ſi in qvibuſdam a vero tranſverſum egerit præcipitantia. Cum caloris ſit minutas & faciles motu partes, qva data porta, diffundere, cumqve, Nicotianam ſubtiliſſimis ſcatere particulis, manifeſtiſſimum ſit, non dubito, qvin impulſi in nares pulveris vires una cum ſubtiliſſimis effluviis non modo per excretorios lymphæ ductus (qvi in naribus ut copioſiſſimi, ita & breviſſimi) conglomeratas glandulas tunicæ narium ſubſtratas ſubeundo ſangvinem aggrediantur, craſſosqve in eo & viſcidos humores incidendo ad

excretionem aptos reddant, ſed & per continuum punctis lacrymalibus canalem ſurſum latæ palpebram inter oculiqve globum ſe inſinuent, ibiqve, ſi non aliud peragant, ſaltem obductam corneæ viſciditatem ſenſim fluidiorem reddant. Nec enim ſemper ea humoris palpebras interius oblinentis eſt limpiditas, qvin aliqvando immixtæ craſſiores viſcidioresqve particulæ tunicis oculi adhæreant, diſcuſſis tenuioribus: id qvod beatæ memoriæ Parenti contigit ſæpius, qvi zingiberis radicem ſaliva humectatam oculis admovendo poſt uberem humoris effluxum brevi priſtinam oculis aciem reſtituebat. Scilicet ſubtiles, acutæ & calidæ zingiberis particulæ & membranas ſtimulando lacrymas provocabant, & craſſum, qvi membranis obductus erat, humorem incidendo attenuandoqve liberiorem radiis aperiebant ingreſſum. Qvid ſi qvis opinaretur, tenuiſſimas medicamentorum iſtorum partes ipſam corneam penetrare, humoresqve attenuando depurandoqve tranſmittendis radiis aptiores reddere? Credidere multi, in faſcinatione ex infecti corde adſcendentes ſpiritus per ejuſdem oculos una cum radiis in alterius oculos penetrare, ſangviniqve ſe jungere, adeoqve ſimilem ibi morbum producere, id qvod in *Lilii Gyraldi Dialogis* me legiſſe exiſtimo, ut alios, qvorum nomina feſtinanti non ſuccurrunt, ſilentio involvam. Qvid qvod & acutiſſimus *Carteſius*, per eaſdem membranas lacrymis exitum patere, in ſuo *De Homine Tractatu* voluerit? Qvod ſi ergo hic lacrymis egredientibus, Veteres autem ingredientibus, noxiis ſpiritibus perviam putaverint corneam, non abſonum eſſet ſubtiliſſimis medicamentorum particulis eandem ingrediendi facultatem tribuere; maxime cum nulla ſit membrana adeo denſa, qvin infinitis fere poris ſit pertuſa. Mittam tamen hoc, cum nec illa de faſcinatione ſententia omnibus ſatiſfaciat, nec *Carteſii* lacrymas explicandi modus, licet ingenioſiſſimus, detectis novis lacrymarum ex utraqve oculi glandula prodeuntibus rivulis, ulla nitatur neceſſitate, nec membranæ, licet poroſæ, ſubtilioribus qvibuſvis promiſcue recipiendis aptæ reperiantur. Suffecerit, Nicotianæ pulverem efficaciſſima ſui parte tum per lymphæ ductus narium excretorios in ſangvinem viam qværere, tum per τρημάτων continuationem ad exteriorem corneæ ſuperficiem adſcendere, cum ex hiſce duobus res tota poſſit explicari; namqve & cornea inde munda redditur, & per venas ad cor demiſſum medicamentum per arterias inde omnes in partes propulſum etiam ad interiora oculi defertur, & per vaſa tum ſclerodem inter choroidemqve delata, tum in fundo oculi ip-

ſoqve retinæ centro conſpicua non ipſam membranæ pellucidæ ſubſtantiam modo puriorem reddit, ſed & contentos tunicis humores limpidos magis efficit. Et qvid amplius ab iſto pulvere poterit deſiderari, qvam ut & tunicæ & humores depurentur, craſſa attenuentur, turbida clara fiant? Reqviritur qvidem & conveniens cryſtallini humoris figura ſitusqve, & hiſce reſpondens pupillæ amplitudo pro lucis majore minoreve intentione varianda; ſed cryſtallini figuram vix medicamentum, facilius ætas mutabit; ſitus vero ejus pro vitrei copia ciliariumqve motu varius eſt; foramen autem uveæ conſvetudini potius certa intuendi objecta qvam certorum medicamentorum viribus parebit. Sic minutiora legere, propius oculis objecta admovere aſſveti remotiora non diſtingvunt; nautæ contra, remota ſemper proſpicientes, ſubtiliora repente oblata vix dignoſcent; hinc ferunt myopes, ſi iter facturi ſemper locum unde egreſſi reſpexerint, tandem naturæ vitium emendaturos. Scilicet muſculi naturam uvea æmulatur, qvæ tamen radiorum lucis imperium potius qvam voluntatis ſeqvitur; qvandoqvidem & in me & in aliis obſervaverim, admota candela, vel radiis Solis admiſſis, conſtringi eam, nobis etiam reluctantibus. Sed qvid hæc ego multis? Nempe diſcipulorum eſt, ſententiam ſuam Præceptorum judicio ſubmittere, ut, ſicubi Præceptorum rationes non fuerint aſſeqvuti, in viam reducantur. Idem mihi a te polliceor, Clariſſime Vir, ut, ſi vel a vero aberravero, vel diſtincte parum hæc propoſuero, te monente, meliora ſeqvar. Anteqvam autem hæc miſſa fecero, pauca de re in propriis obſervata oculis ſubnectam. Meminit in *Peireskii Vita Gaſſendus*, ipſum *Peireskium* obſervaſſe, oculos ſuos exceptas rerum imagines diutius aſſervare, maxime cum a ſomno, ut ille refert, humeſcerent. Simile qvid etiam mihi non ita pridem contigit, cum una cum Nobil. *Gerſtorphiis* meis fallendi temporis ergo vitro utrinqve convexo radios Solis colligendo imaginis varietatem pro vario vitri ſitu obſervarem. Suam namqve oculis imaginem fortiter adeo impreſſerat igneus ille Solis diſcus, ut in obſcurius recedenti cubiculum & umbroſum parietem reſpicienti ipſiſſimus ille ignis in pariete rutilare videretur, ſenſim tamen evaneſcens. Nec unica tantum Solis in oculo relicta idea, ſed qvot nobis ab inſpectione Solis in aëre volitare circuli videntur, tot ardentes notare licet globos, ſi uno evaneſcente alterum proſeqvutus fueris, donec ſe in pariete ſtiterit viſum egregie fallens flamma. Qvod ſi vero luce illuſtratus fuerit paries, alii præter

rutilum apparebunt colores, non jam integrum orbem, ſed exterio-rem orbis limbum vel annulum referentes: exiſtimarem, hic reſili-entes ab illuſtrato pariete radios id agere, ne impreſſa ante idea diſtincte ita obſervaretur, ut ſolet alias, cum umbroſum, qvippe nullos reflectentem radios, aut ſane pauciſſimos, locum intuemur.

Sed vereor, ne nimis multa de oculo; addam duntaxat unam alte-ramve in abdomine canis non ita pridem ſecti oblatam mihi obſer-vationem. Venarum meſaraicarum trunci ſinguli circa inteſtina utrin-qve proximo continuati liberum ſangvini ex uno trunco in alterum dabant regreſſum, iſtaqve venarum anaſtomoſis vel potius continuatio perfecta in toto meſenterio conſpiciebatur, ita tamen, ut ex iſtis intermediis ductibus ſuos inteſtina omnia rivulos acciperent. In eo-dem cane inter renes verſus receptaculi finem albiſſima ſe gelatina in anſerini ovi magnitudinem accumulaverat, qvam, detracta non-dum communi peritonæi tunica, chyli receptaculum eſſe, cum ad-miratione ſuſpicabar; mox vero, cum nudata omnibus involucris materia non deflueret, agnovi errorem, remotoqve glutinoſo humore ipſum ſuo loco chyli receptaculum inveniebam.

Plura hiſce adjungerem, niſi tum epiſtolæ limites tranſgredi, tum tua in tyrociniis meis relegendis patientia abuti viderer. Qvem de-ſideras, libellum meum a *Matthiade* tibi jam tum oblatum ſpero una cum *Rolandi Sturmii* de Febrifugo pulvere tractatu. Vale Cla-riſſime Vir, & favere perge

diſcipulo

Leidæ 21. Maji
An. 1662.

Tibi

addict.

NICOLAO STENONIS

IX

OBSERVATIONES ANATOMICÆ IN AVIBUS & CUNICULIS

THOMÆ BARTHOLINO HAFNIAM

CUM pauculas meas luci publicæ exponerem obſervationes, decreveram, repoſito in commodiora tempora cultro Anatomico, Geometricum radium tantum non abjectum reſumere; ne omne oleum & operam perdidiſſe viderer, ſi omnino deſererem ſtudium, cui non paucas olim impendi horas, qvodqve non ut primarium, ſed ut unicum tractaſſem, niſi anguſta domi res utilia jucundis præferenda non tam ſvaſiſſet, qvam imperaſſet. Sed vix purgati ſangvine digiti jucundiſſimo illo pulvere leviter erant perſperſi, cum Virorum Clariſſimorum partim minæ ſatis acerbæ, partim ſcripta parum amica meamqve ſententiam ſenſu non meo proponentia deſideratam diu felicitatem mihi inviderent, & ut reſpondendi, ſic qvoqve ad ſangvinarium illud exercitium revertendi imponerent neceſſitatem.

De Clariſſimo *Blaſio* noſtro nil dicam, qvi cum ex illo tempore intra privatas ſe litteras continuerit, nec ego publice qvicqvam judicavi movendum; & ſpero, eandem illam humanitatem tuam, qvæ te medium in illa cauſa promiſit, etiam id effecturam, ne & ille animo tantillum forte commoto habenas laxans ſibi ipſi obfutura ſit propoſiturus (id qvod ab illo privatim jam tum factum demonſtrare poſſem, ſi ſcribendi deſiderio flagrarem), et ego rem totam candidi lectoris oculis ſubjicere coactus bonas horas collocare tenerer in re famæ qvidem innocentiam ſpectante, ad ſtudia vero vel publica vel privata ne tantillum conferente. *Deuſingius* vero noſter qvo fervore

Clariſſ. Dn. *van Horne* aggreſſus ſit, qvibus me titulis ornaverit, rem tibi non ignotam exiſtimo. Qvod ſi, ut in invehendo in alios facundia nemini cedit, ſic in demonſtrando de veritate cum Mathematicis certaret, omnibus, eadem cum illo non ſeqventibus caſtra, eſſet terrori; ſed jam de telis ejus dicere licet, qvod olim de Jovis fulmine apud *Lucianum* Timon: οὕτω δαλόν τινα ἐπανατείνεσθαι δοκεῖς αὐτοῖς, ὡς πῦρ μὲν ἢ καπνὸν ἀπ'αὐτοῦ μὴ δεδιέναι, μόνον δὲ τοῦτο οἴεσθαι ἀπολαύσειν τοῦ τραύματος, ὅτι ἀναπλησθήσονται τῆς ἀσβόλου. Sane, niſi id agendum eſſet, ne aliorum ſilentium ſuam interpretaretur victoriam, paterer ipſum impune convitiari. Ut myſteriis pleniſſimus tandem impleretur numerus, acceſſit etiam *Antonius Everhardi,* Medicus Medioburgenſis Clariſſimus. Hic modeſtia reliqvos ſuperans, ut a convitiis abhorret, ſic & abſtinet a rationibus, non tamen ab experientia. Edidit paucos ante dies tractatum, cui hic eſt titulus: *Lux e Tenebris Affulſa, Ex Viſcerum Monſtroſi Partus Enucleatione;* in qvo poſt deſcriptionem monſtri capite & pectore carentis primo, hepar velut inutile pondus a qvibuſdam fruſtra proſcribi, conqveritur, cum ejus eadem qvæ cordis ſit neceſſitas (viderat qvippe in hoc monſtro duo corcula hepati tanqvam appendices ad utrumqve latus adjuncta), hinc me in ſcenam producit, &, dari vaſa lactea ſuccum lacteum in partium ſpermaticarum vulgo dictarum nutrimentum ablegantia, id qvod ego tum rationibus, tum experimentis impugnaveram, ſuorum ſe oculis demonſtraſſe, credit. Sed aut me oculi fallunt, aut Zeelandicis cuniculis dedit Natura, qvod Hollandicis denegavit. Aperui ſeniorum cuniculorum abdomina, juniorum extra inſpexi, fœtarum & ubera examinavi & uterum, ſed necdum licuit mihi eſſe tam oculato, ut alias præter meſentericas & thoracicam, qvæqve ex mammarum glandulis ortæ ad papillam lac deferunt, obſervarem lacteas; ſed nec in iiſdem fruſtra unqvam vel in hepate, vel in collo, vel infra capſulam, vel in ingvinibus lympham qvæſivi, teſtibus Viris Clariſſimis *Sylvio* & *Borrichio,* qvi ſua ſectiones meas præſentia fere ſemper ornarunt. Non ita pridem, qvæ infra receptaculum decurrunt, vaſa omnia uno vinculo conſtrinxi, ratus fore, ut, ſi ulla vaſa lactea ibi eſſent, ſuo ſe proderent indicio; ſed a ligatura illico, qvicqvid vinculum inter & capſulam erat, evanuit, cum ultra vinculum magnus vaſorum numerus in majorem molem magis magisqve ſenſim attolleretur præter limpidiſſimam lympham nihil omnino continen-

tium. Sed de re a prima lymphaticorum inventione tibi notiſſima plura ſi adderem, inepti nomen nulla ratione poſſem evitare.

Cum itaqve hoc, ut vides, Excellentiſſime Vir, modo Clariſſimorum Virorum partim privatæ litteræ, partim publica ſcripta ad Anatomica me exercitia iterum retraxiſſent, ne freqvens ejuſdem rei indagatio faſtidium pareret, in varietate delectationem judicavi qværendam: qvo fine cum varia ad partes vocarem animalia, in corvo aqvatico, ſtolfer vocant Belgæ, qvædam vidi in aliis animalibus mihi necdum obſervata. Præ cæteris mirabar elegantes admodum vaſorum bilariorum pancreaticorumqve in inteſtina inſertiones; namqve & bilis per duos diſtinctos ductus, qvorum alter a veſicula, ab hepate alter oriundus, in inteſtina ſe effundebat, & pancreaticus ſuccus per totidem canales medio inter prædictos ductus loco egrediebatur, ita ut pancreatici ductus a ſe mutuo digitum diſtarent, & ab illis utrinqve bilarii ad ſeſqviditi diſtantiam eſſent remoti: omnia vero qvatuor oſtia pylorum reſpiciebant, qvem inter & proximum fellis canalem interſeptum ſpatium ſpithamam excedebat. Gratum hoc ſpectaculum ad aliarum avium viſcera examinanda me invitavit: & ecce caſu ſe mihi offerentem anatem, cujus inteſtina totidem qvidem tum bilarios, tum pancreaticos excipiunt ductus, orificiis tamen minime & ut in priori diſtinctos; omnibus qvippe qvatuor ductibus unus idemqve in inteſtina eſt ingreſſus, & ut per pancreaticos inſerti ſtyli pylorum reſpiciunt, ſic per bilarios demiſſi contrarium obtinent ſitum, ut adeoqve in ipſo exitu ſe interſecantes ſetæ crucis formam imitentur. In canibus vidi, ex eodem pancreate duos ad inteſtina ferri ductus, nondum tamen, niſi unica via bilem eo deferri, obſervare licuit. Piæ memoriæ Parens Clariſſimi Viri meminit in *Anatomicis Inſtitutionibus,* communem ductum aliqvando bifidum repertum, ubi tamen, diverſane fuerit utriuſqve origo an eadem, non additur. Sed ut ad corvum noſtrum redeamus: veſicula fellis non accumbebat hepati, ſed per mediam pingvedinem ad trium fere digitorum latitudinem extenſa venæ portæ truncum & ſitu &, obiter inſpecta, etiam colore referebat, amplitudine vero major, utpote auriculari meo craſſitie non cedens. Qva hepati jungebatur, tres ejus obſervabantur ramuli, unus, qvi in hepar adſcendens infinitos emittebat ſurculos; alter minor & tranſverſim verſus hepaticum tendens; tertius, ante nominatus, inteſtina verſus deſcendens. Inflata veſicula in inteſtinalem ductum vento via patuit; alia non licuit in

hoc ſubjecto penetrare, an qvod nullis in hepar vel hepaticum pateret ingreſſus, valvulis viam præcludentibus, an qvod bilis craſſior meatus obſtruxiſſet.

Hæc aliaqve examinantes ad elegantius ſpectaculum langveſcens cordis motus invitavit. Erat enim huic pullo cor adeo vegetum, ut micationes ejus ad ſecundam uſqve ab apertione horam ne tantillum qvidem vel a celeritate ſua, vel a robore remitterent, ut adeoqve, ne otioſi eſſemus ſpectatores, non modo prædicta bilis vaſcula interea obſervaverimus, ſed & varia alia, ut membranas diaphragmatis munere ex *Harvæi* ſententia fungentes, renes cum ſuis ureteribus ureterumqve egreſſu, ventriculi figuram, ſitum, tubulos circa ſiniſtrum orificium plurimos, jucundiſſimam ventriculi ſuperficiei interiori adhærentem viriditatem, & qvæ alia in abdomine contenta nec temporis, nec chartæ anguſta ſpatia modo recenſere patiuntur, qvæqve præterea in aliis tibi ſubjectis ſæpius viſa. Corde itaqve jam tandem deficiente, ut eo oculos mentemqve verteremus, author erat Clariſſimus *Sylvius* (acceſſerat ille cum Celeberrimo *Piſone,* & Medico Gedanenſi Clariſſimo Dn. *Gottwaldo,* licet Dominum *Piſonem* urgentia qvædam negotia Amſtelodamum revocantia non diu mihi Summi Viri præſentiam indulſerint), qvi ſæpius a ſe in canibus obſervatum dixit, non cor, ſed proximam cordi cavæ partem ultimo mori: cujus obſervationis veritatem etiam noſtra hæc avis confirmavit. Corde namqve rarius micante, & auriculæ patuit motus, & cavæ a motu cordis manifeſtiſſime diſtinctus, qvi corde jam omnino emortuo ad duodecimam uſqve meridianam (hora enim nona matutina aperiebatur pectus) continuavit in ramo cavæ deſcendente, qva cordi jungitur, & auriculæ parte, qvæ cavæ proxima; ſed &, auricula munus ſuum tandem intermittente, ſola cava etiam poſt ſecundam pomeridianam viſa eſt moveri, & reſecto dextro cordis ventriculo, omniqve, qvi hepar inter & cor in cava erat, ſangvine exhauſto, videbatur nihilominus in concidentibus in ſe cavæ tunicis fibrarum tranſverſarum unius alteram excipientis intumeſcentia ſuperiora verſus adſcendens. (Diſſecto hinc corde in dextro ventriculo præfixam auriculæ valvulam vidi unicam tantum, eamqve carnoſam, qvalem etiam in gallina inde obſervavi.) Idem in aliis inde ſubjectis qvæſitum, ſed ſucceſſu non eodem. Namqve cavæ qvidem motum omnium eſſe poſtremum, in qvatuor, qvos inde ſecui, cuniculis obſervavi, fibrarum autem cavæ motum in eorum nullo

notare contigit. Sed & hoc cuniculis peculiare, qvod, ut aviculæ cava qva ramum deſcendentem pulſabat, ſic in illis ſoli adſcendentes rami ſe per intervalla conſtringerent. Adſcendentium autem ſiniſter in cuniculis a cava proxime ſupra auriculam exit, & hinc tranſverſim ad baſin cordis ſiniſtrorſum latus tandem recta adſcendit: atqve ita ad auriculam dextram tres cavæ rami confluunt, deſcendens puta & adſcendentium uterqve, aut ſi ſecundum ſangvinis motum deſcribenda vaſa, deſcendentium uterqve cum adſcendente, qvi tantum unicus. Primus eorum, in qvibus primum movens qvæſivi, hæc tantum exhibuit: deficiente cum corde auricula qvinqvies, ſæpe ſexies pulſabat cava, anteqvam vel ſemel auricula micaret; educto ſangvine ceſſarunt omnia.

Paucis inde diebus alter in ſcenam protractus cuniculus, in qvo, remittente tantillum auriculæ dextræ reciprocatione, diſtinctius cavæ, tum dextro, tum ſiniſtro in ramo, motus conſpiciebatur, qvi tunicis licet ad tactum frigidis nihilominus continuavit, nec reſecto cordis mucrone ceſſavit, ſed novo ſangvine, poſt priorem exhauſtum, ex hepate propulſo de novo ſibi reſtitutus non minori ac ante vi tunicas per intervalla ſtringebat: etiam ad tertiam a ſectione incepta horam, cum poſt ligatum cavæ truncum adſcendentem, expreſſumqve omnem ſangvinem, latera vaſorum ſibi mutuo incumberent otioſa, reſecto iterum vinculo iterum priſtinus rediit motus.

Qvæ in tertio cuniculo nobis viſa, diſtinctius obſervabantur: in auriculæ limbo motus notabantur contrarii, modo enim ab inferiori angulo ſuperiorem verſus movebatur, modo contrario ritu a ſuperiori verſus inferiorem qvaſi repere qvid conſpiciebatur; cumqve limbus jam plane eſſet emortuus, videbatur nihilominus in medio qvaſi plano fibra qvædam ſua contractione vitæ indicia edere. Non hic apicem cordis, ut in priori, reſecui; ſed per exiguum admodum foramen, vix aciculæ caput admittens, cum ramis cavæ, tam adſcendentibus, qvam deſcendenti, vincula injeciſſem, ſangvinem eduxi, & illico qvievere omnia; ſed cum illæſa cordis vaſcula novum ſuppeditarent, brevi rediit motus, licet ſatis exiguus, qvi tamen ſolutis omnibus vinculis momento qvaſi invaluit. Circa veſpertinam ſextam aperueram animal, & nihilominus poſt horam meridianam nonam micabat cava, qvæ interea temporis ſæpius, ob repetitas ligaturas, non paucas micationes intermiſerat; & jam ultimo vincula removeram, cum manifeſte admodum & diſtincte viderem in ipſo angulo,

qvo loco cum ramo cavæ inferiori ſuperiores concurrunt, tunicam qvaſi momento in arctum contrahi, & poſt ſecundum qvemlibet hujus anguli ictum ipſos ramos adſcendentes moveri.

In qvarto nihil a reliqvis diverſum notavi, qvod cordis aut cavæ motum ſpectaret.

Et hæc ſunt, Clariſſime Vir, qvæ mihi de parte ultimo omnium movente licuit obſervare: de cauſa motuum horum modoqve necdum vel cogitare auſus ſum, cum, qvod rei iſtius difficultas exigit, tempus alia negotia mihi invideant, &, rem viribus meis majorem eſſe, ingenii imbecillitas perſvadeat. Qvod ſi placeret humanitati tuæ ſummi & divini ſui judicii ſententia me informare, maximus priſtinis tuis in me beneficiis accederet cumulus.

Prodiit hiſce diebus *Carteſii Tractatus de Homine* una cum figuris a *Florentio Schuylio,* inclytæ urbis Sylvæ Ducis Senatore, & ibidem Philoſophiæ Profeſſore, editus, in qvo figuræ conſpiciuntur non inelegantes, qvas ex ingenioſo cerebro prodiiſſe certum eſt; an vero tales in ullo cerebro conſpiciendæ, valde dubitarem. Sed nimis diu Clariſſimum Virum detineo: cujus tempus gravioribus curis ſacrum. Vale itaqve, Clariſſime Vir, & favere perge

Tibi addicto

Dabam *Lugd. Batav.*
An. 1662. 26. Aug.

diſcip.

NICOLAO STENONIS

EX VARIORUM ANIMALIUM SECTIONIBUS HINC INDE FACTIS EXCERPTÆ OBSERVATIONES CIRCA MOTUM CORDIS AURICULARUMQVE & VENÆ CAVÆ

NN X NN

1.

IN fele, cum periſtalticus inteſtinorum motus vaſorumqve bilariorum multi magniqve tumores diutius nos in ſui examine detinuiſſent, ad cor revertentes qvieta omnia invenimus; ſed vix ter qvaterve digitis compreſſeram, cum illico & cordi ſuus & cavæ redire motus, licet rarus admodum, ſed ſimul & admodum diſtinctus, adeo qvidem, ut manifeſte pateret, in cava motum, a parte tum ſuperiore tum inferiore incipientem, circa cor deſinere.

2. In cane dum flatum ex arteria cœliaca in lymphatica hepatis deducere fruſtra conor, moritur animal: mox aperiendo pectus cor flatu admodum turgens a pericardio libero, & ſimul rediiſſe motum video.

3. Ad eundem finem præſentibus amicis aperueram hora qvarta pomeridiana canem, ubi, cum in lympha eandem expertus fortunam re infecta eos dimiſiſſem, & ab aliis amicis detentus hora ſexta redirem ad cadaver, cordis ventriculos admodum diſtentos vidi, qvos digitis tantillum agitando, moveri auriculam, ſimulqve vicinam auriculæ cordis partem manifeſte contrahi, obſervavi. Sed qvod maxime mirabar, ad ſubjectum hora octava a cœna redux tumidum ſemel tangendo, ſæpius pulſare auriculam manifeſto deprehendi, id qvod ad horam uſqve nonam repetitis vicibus eodem ſemper modo obſervavi.

4. In alio cane vidimus modo qvintam, modo ſeptimam qvamvis auriculæ micationem unum cordis motum excipere, circa arteriæ pulmonalis cum corde connexionem; in ipſo exortu poſt qvamlibet

cordis contractionem oriebatur tunicæ extra carnem cordis protuberantia; qvieſcens cor, cum pungeretur circa dextrum ventriculum, micabat illico, immotum manens, utcunqve alio in loco vellicaretur.

5. In cane vidi exſectum cordis mucronem digitis impoſitum, ſive ungve, ſive cultro vellicaretur, conſtringere ſe, ita qvidem ut in ſe retractis lateribus digito decideret, ſed & mucronem eundem invertendo vidi itidem moveri.

6. Fœtum canis, poſtqvam e membranis exſectus aërem ante ætatem hauſtum repetitis cum ejulatibus ſæpius exſpiraſſet, aperto demum pectore, digitis impoſitum ita intorqvebam, ut & cordis pateret motus & arteriæ ductus: vidiqve tenellum cor & tranſparens, cum a baſi receſſiſſet mucro, rubere, cum ad baſin accederet mucro, carnis exſuccæ inſtar albere, vicina arteria ſangvinem non tumore tantum, ſed & colore manifeſtante, qvi ob factum in vicinia vulnus illico effluxit. Initio ad qvemlibet auriculæ ictum bis micabat cor, ſed inde non niſi ſecundum qvemlibet auriculæ pulſum unicus cordis motus excipiebat. Exſectum inde cor, & manuum calore fotum, etiamſi vicies & ultra ab omni latere acu tranſſoderem, ſuum nihilominus ad longum tempus continuavit motum.

7. In cuniculis anteqvam ad motum progrediar, de ductu vaſorum, qvorum ſæpius futura mentio eſt, ſciendum: cavæ ramos tres eſſe, inferiorem unum diaphragma penetrantem; ſuperiores duos, alterum recta in dextro latere adſcendentem, alterum, qvi a dextro trunco juxta baſin cordis tranſverſim ſiniſtrorſum fertur, inde in ſiniſtro latere adſurgentem. His præmiſſis, qvæ motum ſpectabant, fuere ſeqventia. Corde cum auriculis qvieſcente vidi cavam ſuperiorem motum ſuum continuare, etiam reſciſſo cordis mucrone, etiam exhauſto, qvi in illa erat, ſangvine, modo novus ſuccederet, etiam frigidis ad tactum omnibus, jam tertia poſt cœptam ſectionem hora, ſed &, anteqvam obrigeſceret cor, obſervavi varium in illo motum, prout digitis varie comprimeretur.

8. In alio vidi cavæ partem auriculæ annexam interdum qvinqvies, non raro ſexies pulſare, anteqvam vel ſemel moveretur auricula.

9. In cuniculo femina, præſentibus Clariſſimis Viris Dn. *Sylvio* & Dn. *van Horne*, circa An. 1662 menſe August. diſſecta, varia, præſertim auricularum & cavæ motum ſpectantia, fuere obſervata. Parcius & lentius micante dextra auricula patuit tandem motus cavæ & in dextro & in ſiniſtro ramo, ubi poſt binas tresve cavæ pulſa-

tiones ſemel movebatur auricula, modo tamen non ſemper eodem; interdum enim in limbo auriculæ ab inferiori angulo verſus ſuperiorem ſerpebat motus, interdum contraria plane ratione a ſuperiore angulo ad inferiorem idem limbus videbatur concuti, nonnunqvam limbo plano qvieſcente in medio qvaſi plano auriculæ qvædam erat contractio. (Etiam in corde columbæ vidi motum ab uno auriculæ angulo incipientem ad oppoſitum pergere.) Ligatis dein tribus cavæ ramis, & omni, qvi ligaturam intra in cava auriculaqve & dextro ventriculo erat, ſangvine educto per foramen exiguum in fundo dextri ventriculi parvula acu factum, ſimul omnis ceſſavit motus, ut emortua omnia dixiſſes. Sed non diu duravit hæc qvies, qvandoqvidem novus ex venis cordis egurgitans ſangvis, cavæ in ſe collapſas tunicas tantillum diſtendens, novum, ſed exiguum, nec niſi in ſola cava conſpicuum, motum produxerit, qvi tamen, cum remota vincula liberum ſangvini ad cor conceſſiſſent refluxum, & cavæ & auriculis reſtitutus eſt integer. Circa ſextam veſpertinam aperueram cuniculum, & poſt mediam nonam, cum ipſa etiam vivere deſiiſſet auricula, vixit adhuc cava: nec idem experimentum præſentibus aliis amicis repetenti ſucceſſum denegavit. Educto enim per idem cordis vulnus ſangvine iterum admiſſo, ad ſolitum rediit motum, & id qvidem modo peculiari, namqve in ipſo angulo, ubi ſuperiores cavæ rami cum inferiori concurrunt, & qvidem præcipue in ejuſdem anguli latere ſiniſtro pulſus obſervabatur, ab omni reliqvarum partium motu omnino diſtinctus: ad ſecundum qvemlibet hujus anguli ictum ſemel ramus tum dexter, tum ſiniſter movebatur. Sed & in dextro ramo jam langveſcente videbatur motus inde incipere, ubi pericardium perforat, & verſus cor continuari.

10. In cuniculi fœtibus ex utero extractis notavi, cor poſt contractionem fieri longius, & ſi commodo ſitu teneatur, manifeſte patere, cum longius ſit, proprio pondere concidere; prout enim variaveris ſitum, ita verſus diverſa latera labitur. Corde ita collapſo primo pulſant auriculæ, inde momento qvaſi conus cordis anteriora verſus ſurſum elevatur, dextra ventriculus intumeſcens brevior fit, totum cor ad contactum durius, & mox pulmonalis arteria viſa intumeſcere. Reſectus conus non pulſavit; reſecto dextro pulſavit nihilominus ſiniſter; reſectis auriculis & arteriis, in manu pulſavit ipſum cor, cum vellicaretur; cum movetur auricula, præſertim ſiniſtra, in medio ejus plano depreſſio manifeſta eſt.

11. In corvo aqvatico juniori de arbore nobis præſentibus e nido ſuo excuſſo, cum circa ſecundam ab apertione horam inciperet langveſcere cordis motus, manifeſte ab illo diſtingvi poterant ut auriculárum ita & cavæ micationes: omnes tres motus etiam tempore a ſe invicem diſtincti; corde vero tandem qvieſcente pars auriculæ proxima venæ cavæ diu ſupervixit, donec &, auricula omnino immota, ſola pulſaret cava infra cor, duos a ſe invicem plane diſtinctos exhibens motus, qvorum alter in parte remotiore exterius conſpiciebatur, alter interiori latere in parte cordi proxima; ſed qvod mirabar maxime, nec in alio inde ſubjecto licuit obſervare, id erat, qvod, reſecto cordis ventriculo dextro, omniqve exhauſto ſangvine, permanſerit nihilominus in ipſis venæ tunicis, jam penitus in ſe collapſis, motus, qvo fibrarum tranſverſarum una poſt alteram aliqvantulum elevabatur, filum ſuper venam tranſverſim ductum referens, idqve cor verſus pergendo, qvi motus ſecunda pomeridiana necdum ceſſaverat, cum tamen ante meridiem hora nona ſectionem incepiſſem.

12. Gallinæ ſectio, præter alia ſatis egregia, qvædam etiam cordis motum ſpectantia exhibuit hoc loco non reticenda. Nam ut, qvæ de cordis auricularumqve motu ſatis ſunt vulgaria, omittam, non modo cavæ tum inferioris uterqve ramus, tum ſuperioris ea pars, qvæ ad baſin cordis tranſverſim dextrorſum fertur, diu movebatur qvam diſtinctiſſime, ſed &, qvæ per ipſam cordis longitudinem a cono baſin verſus ferebantur, venæ tam clarum motus ſui edebant indicium, ut etiam tunicæ concuſſio eo loco videretur incipere, qvo conum verſus radiculas ſpargit, & inde ad baſin uſqve cordis continuari.

13. Cor pulli, ex ovo ſeptima die ab incubationis initio extracti, ab omnibus vaſis liberatum diu in manu mea pulſabat, inde, mortui inſtar qvieſcens, oris anhelitu in vitam iterum revocabatur, id qvod ſæpius in eodem corde ſucceſſit.

14. In alio pullo cum poſt diuturniorem in reliqvis partibus moram ad cor tardius redirem, totum corpus calida manu fovendo, & ſimul cordi tepidum digitum admovendo, priſtinum motum illi reſtitui. Inde iterum mortuum, dum ex hepate novum ſangvinem eo propellerem, ſecundo in vitam revocavi. Similiter & alterius mortuo jam cordi vitalem ignem fotu digiti reſtitui. Sed & junioris cuniculi emortuum cor digiti calore ad ſe reverſum ultra centies ſponte micare obſervavi.

Ex dictis colligitur:

1. Motum intermiſſum redire ad vellicationem, ſive a re ſolida, ut acu, cultro, ungve, ſive a ſangvinis vel halitibus, vel dilatatione.

2. Motum non eſſe totius ſubſtantiæ, ſed ſingularum fibrarum, nec tantum fibrarum integrarum, ſed & utroqve extremo carentium.

3. Fibras non toto ductu ſimul, ſed ſenſim per partes contrahi, incipiendo ab uno extremo & verſus alterum continuando, id qvod & in periſtaltico inteſtinorum motu conſpicitur.

Poſſent inde & alia concludi, qvæ fuſius exponentur, ſi Deus me patietur abſolvere, qvæ de corde olim cœperam. Licebit interea aliis experiri, qvantum dabitur progredi in motus animalis modo & cauſa inveſtigandis. Mihi validiſſimum argumentum ad humani ingenii arrogantiam conculcandam porrigit: 1. qvod hactenus tot ſeculorum labore & ſpeculatione nihil circa motus animalis veram cauſam & modum detexerunt philoſophi, 2. qvod, qvi de illa materia ſententiam ſuam magna cum authoritate pronuntiaverunt, omnes falſa nobis dogmata pro demonſtrationibus venditarunt. Abſit, plenam omnium expoſitionem promitterem: Deo tamen gratiæ debentur, qvi ſaltem errantium falſitatem omnibus evidentem reddidit. Prudenter olim ille:

Virtus eſt vitium fugere, & ſapientia prima
Stultitia caruiſſe.

DE VESICULIS IN PULMONE. ANATOME CUNICULI PRÆGNANTIS. IN PULMONIBUS EXPERIMENTA. DE LACTEIS MAMMARUM. IN CYGNO OBSERVATIONES, &C.

XI

THOMÆ BARTHOLINO HAFNIAM

SI unqvam ulla, præſens certe ſcriptionis celeritati juncta reſponſionis tarditas excuſatione opus habet: cum &, binis licet eodem tempore beatus litteris, nullas tot menſium decurſu remiſerim, & modo, cum reſpondendi officium differre amplius non liceat, temporis invidiam argumentorum copia experiatur. Sed facilem utriqve veniam nulli non decantata facilitas tua promittit.

De pulmonum parenchyma ſpectantibus *Malpighii* oſervationibus ulteriorem meditandi occaſionem deſideratum diu tandem vero mihi ab amico oblatum microſcopium præbuit. Lectis qvidem tuis tum ad D. *Borrichium*, tum ad me litteris, non dubitavi, qvin variæ in pulmonibus demonſtrari poſſint veſicæ, & qvidem modo non uno. In exſiccatis enim, ſi prius *Malpighii* exemplo omnis eluatur ſangvis, qvam exponuntur ſiccandi, plurimas, ubi diſſecti fuerint lobi, conſpiciendas cavitates ſine omni controverſia eſt: diſſecantur enim ſimul plurimi, tum venæ, tum utriuſqve arteriæ, ramuli, qvos omnes manifeſtis cavitatibus donatos nulli non manifeſtum. Qvod ſi vero etiam, anteqvam ſiccentur, aëre pulmonum diſtendantur bronchia, qvot qvantasqve in diſſectis videre licebit cavernulas? Sane cum arteriæ aſperæ extremitates ſine numero per totam pulmonum ſubſtantiam diſpergantur, flatu eaſdem violenter diſtendente, innumerarum veſicularum, ſi dividantur, ſpeciem exhibebunt. Sed ideo ſtatuendum, pulmonum parenchyma ex puris veſiculis conſtare, non videtur neceſſarium. Qvid qvod ne qvidem inde ſeqvatur, vel ſolius

aſperæ arteriæ extremitates in veſiculas deſinere, ut de extremitatibus venæ, arteriæ, lymphaticorum nihil addam. Qvantum in arido canis pulmone microſcopium mihi revelavit, præter rotunda diſſectorum vaſorum foramina & minutiſſimorum filamentorum ſine lege currentes myriades, nihil omnino conſpiciebatur, nullæ rotundæ membrana undiqve veſtitæ cavernulæ, nihil plane veſiculæ nomine ſalutandum. Nec ipſa ſiccati pulmonis illæſa ſuperficies veſicularum ſub microſcopio ulla exhibuit indicia; aderant protuberantiæ, ſed illæ, ut magnæ, ita & inæqvales, nec in medio tumentes, nec in ambitu orbiculares, adeoqve veſicularum nomen minime tuentes. Abſit tamen, ideo ingenioſiſſimi Viri experimento fidem detraherem, qvod mihi ſemel iterumve idem tentanti non ſucceſſerit, viam forte non eandem ingredienti. Sed de *Malpighio* hæc ſufficiant, donec ipſas ejus *Litteras* examinare licebit.

Ipſe his diebus cuniculum aperiendo, cætera ut in commodiorem locum remittam, circa fœtuum (qvos utero geſtabat qvatuor) pulmones ſeqventia obſervavi: Relicto ſuas intra membranas in utero qvarto fœtu, reliqvos tres extractos ab involventibus tunicis liberavi, unius etiam ligavi umbilicum, & ecce poſt brevem moram moventes os pectusqve catulos & tandem aërem magna vi haurientes, ut plenam reſpirationem omnes facile poſſent agnoſcere, inde pedum vires ipſi tentando, poſt paucos niſus eo uſqve invaluere, ut eorum unus, hinc inde perreptando, tandem ſub expanſæ per menſam matris cruribus, ab aëris frigore minus ibi vellicatus, qvieſceret. Extraxi ex tepido ſuo aſylo vegetum animal, & pro viribus ſatis reluctantis pectore diſſecto pulmones reperi albicantes jam tum & ſpongioſos, licet alterius intra membranas ſuas in utero exſtincti pulmones denſi, ſangvinolenti & his omnino eſſent diſſimiles, miratus, tantam tam brevi tempore factam mutationem. Superiori ætate in cane gravida circa reſpirationem idem obſervavi, ad pulmones tum temporis non attendendo, ubi fœtus, licet necdum partus tempus inſtaret, exſecti vitaliqve auræ expoſiti hauſtum aërem cum repetitis ejulatibus reddiderunt. Sed hæc freqventia; rarum qvod ingenioſiſſimus juvenis & in Anatomicis exercitiis aſſiduus Dominus *Swammerdamius* mihi exhibuit, aërem per medios pulmones in cor propellens. Deficiente animalis vita, veſica qvadam reciprocum pulmonum motum reſpirationis æmulum continuat, donec tandem per venæ pulmonalis ramos in cor deſcendentes bullæ experimenti ſucceſſum

demonſtrent. Memoratu qvoqve dignum videtur, qvod apud eundem ut & inde apud Dn. *Padbrugium*, juvenem itidem Anatomica magno cum fervore tractantem, circa motum cavæ notavi, ab ingenioſiſſimo Dn. *Lahr* primo obſervatum. Viderunt hi, ſi in vivo denudetur jugularis vena, ut & per medium dorſum in abdomine decurrens cava, qvotieſcunqve inſpirando thoracem diſtenderit animal, evacuari & in collo & in abdomine cavam, ita ut, qvæ ante diſtenta rubebat, momento compreſſis tunicis albicet, ad priſtinam & rotunditatem & purpuram illico reditura. Qvi id videre hactenus, varie varias attulere rationes; mihi talem res viſa eſt admittere poſſe explicationem, ſi vacui fugam ad partes vocare liceret. Si enim, ut ajunt, thoracis dilatatione diſtentus pulmo aërem ſugit qvaſi, & attrahit, poſſet dici, propter eandem thoracis ampliationem dilatatam, qvæ intra thoracem eſt, cavæ portionem attrahere illum ſangvinem, qvi in cavæ ramis tam ſupra, qvam infra thoracem reperitur, ideoqve inaniri cavam extra thoracem, qvod, qvæ intra thoracem eſt, cava impleatur. Sed cum vacui fuga fere in totum devicta in vacuum aufugiſſe videatur, vereor, mihi illorum apparet mens, qvi per ſolam pulſionem ſimilia phænomena exponere ſolent, atqve ſecundum hæc dogmata, thorax dum muſculorum ope dilatatus circumſtantia qvælibet eo pellit, ubi minor eſt reſiſtentia, uno eodemqve tempore & in pulmones aërem, & inferiora verſus abdominis viſcera, & in partem cavæ intra thoracem, qvi in cava extra thoracem eſt, ſangvinem propellit, ut adeoqve impleatur cava intra thoracem, qvod, qvæ extra eſt, ſuum eo mittat contentum. Hoc forte modo illud phænomenon explicari poſſet, ſi ulterior experientia idem confirmarit, ſimulqve pateret ulterior reſpirationis in circulatione ſangvinis uſus. Sed qvo me pulmones, qvo reſpiratio abduxerunt? Ad reliqva doctiſſimarum tuarum momenta redeundum.

Lacteas quaſdam ad mammillas ab interioribus tendere, multæ qvidem indicare voluerunt obſervationes, ſed, qvantum ego colligere poſſum, necdum ulla demonſtravit. Sane *Schenckium* nil vidiſſe niſi vaſculum in ipſis mammarum glandulis ortum, & inde ad papillam delatum, ipſe qvam evidentiſſime teſtatur, dum vaſculi ejuſdem preſſu lac per papillam effluxiſſe fatetur. Nec enim facile crederem, ſi qvæ ab interioribus prodirent vaſcula, eadem ad papillam immediate eſſe continuanda, cum inde ſeqveretur, & fruſtra eſſe datum illis glanduloſum parenchyma, & in ſectionibus non ſeparari poſſe ubera

lacte diſtenta ſine vaſculorum eorundem diſſectione, adeoqve nec ſine effuſione lactis, qvorum huic experientia reclamat, illi fidem denegat ratio. Qvod ſi vero ſtatuendum, lactearum duo eſſe genera, unum ab interioribus ad glandulas adſcendens, alterum ab iiſdem glandulis per proprias radices receptum lac ad papillas deferens; non poterit idem Clariſſimus Vir ex ſuo experimento demonſtrare, primi generis fuiſſe, qvod vidit, lacteum, qvod tamen ſolum eſt, de qvo qværitur, cum ſecundi generis lacteæ, qvæ nempe contentum ſuum extra corpus excernunt, a nemine facile in dubium vocentur. Qvod reliqvorum attinet obſervationes, obſcurant illæ rem, non illuſtrant, cum pro authorum varietate varians iſtorum ductuum deſcriptio experimenti fidem dubiam reddat, &, qvæ qvilibet mentis oculis primo vidit, eadem & corporis inde oculis ſe vidiſſe credi- derit. Hic enim a ductu thoracico per thoracis muſculos ad ubera, ille a receptaculo per abdomen ſupra abdominis muſculos eodem, alius ad eandem partem per abdominis muſculos ab utero lactea deducit, & nihilominus experientiam teſtem omnes producunt. Sed qvid, ſi in canibus hic, in cuniculis ille, tertius in homine, qvæ affert, viderit? Qvid, ſi in qvolibet horum triplex ad ubera repe- riendus canalis? Hæ ſimilesqve ſuſpiciones locum forte invenirent, niſi varia ſe illis opponerent, veritatis ſpeciem longe majorem præ ſe ferentia argumenta. Sed hac de re plura, ſi Deo placuerit, in reſponſione ad *Everhardum*, in cujus gratiam, ut eadem obſervarem, ſumptibus non magis peperci, qvam labori, cuniculorum omnem varietatem ad cultri examen revocans, ſed qvo plura hoc in caſu tento, eo lymphaticorum tuorum clarior refulget veritas.

De veſicula fellis, qvæ in corvo obſervata ſcripſi, paullo forte fuerunt obſcuriora, negavi qvippe, hepati accumbere, & tamen hepati jungi dixi. Ideo autem hæc duo putavi diverſa, qvod in reliqvis, qvæ aperire mihi contigit, animalibus veſica non modo fibrillis qvi- buſdam hepati jungatur, ſed eidem media fere ſui parte accumbat, ſecundum longitudinem ejus ſuperficiei communi qvadam pellicula connexa, hic vero unico tantum ramo hepati adhærens reliqvo ſui corpore undiqve libera ſacculi inſtar oblongi ſe mihi exhibuerit videndam. Sed nec *M. A. Severini* obſervatio de vicino cordi hepate in omnibus corvis videtur locum inventura, cum in hoc, etiamſi parvo multisqve in locis adhuc implumi, auriculam dextram inter & hepar aliqvot digitorum fuerit intervallum. Cordis motum, cujus

tum memini, accuratius ut examinarem, tum varia, qvæ aliud agenti qværentiqve ſe per intervalla obtulerunt, experimenta, tum aliæ qvædam rationes occaſionem dederunt: qvo fine in fibras cordis diligentius inqviſivi, de qvibus, favente divina gratia, brevi tractatulum curabo edendum cum adjuncta reſponſione ad *Everhardi* rationes, & *Deuſingii Blaſii*qve convitia, qvorum ultimus amica tua interpoſitione ſepoſita, qvas ante biennium præter propter ad te dederat litteras, feriis proximis Nativitatis Chriſti publicam in lucem emiſit, ubi, ut taceam, qvæ in me evomit, admodum amarulenta, circa ductus iſtius deſcriptionem *Ideæ*qve *Med. Gen.* interpretationem ſex & ultra committit Anatomicos errores, utpote qvi ne qvidem ex mea deſcriptione verum iſtius ductus vel ortum adhuc addiſcere potuit, vel exitum.

Ad crebras alvi excretiones excedentem bilis copiam multum facere, non dubium eſt, minus certum, an ad eaſdem aliqvid conferre poſſit veſiculæ bilariæ ſitus profundior; ut ut eſt, non in hac tantum, ſed & in aliis avibus eundem fere veſiculæ ſitum, bilariorum vero ut & pancreaticorum vaſorum numerum ſemper obſervavi eundem.

Qvid in mure, glire, fele variisqve boum uteris obſervatum, ab amicis, ut puto, jam tum audiviſti, ut & de bile inſipida, nec non de hernia uterina in utroqve canis ingvine reperta.

Cygnus, qvem hiſce diebus aperui, varia exhibuit; præ cæteris mirabar, in utroqve lingvæ latere tredecim præter propter numerari oſtia in eadem recta linea ſita, qvæ ſingula & preſſa ſuccum emittebant, & ſtylum admotum ſatis recipiebant profunde; 2. totam ingluviem, ſed & ingluviem ſupra œſophagum, innumera exhibere oſtiola, unde nullo negotio ſuccus exprimebatur, in ingluvie albicans, aqveus in œſophago; 3. in membranas pulmonum a coſtarum extremitatibus procurrentes fibras carneas, diaphragmatis forte abſentiam ſupplentes; adderem cætera, niſi ab amicis, qvi una aderant, crederem ſignificata.

In humano cadavere Blaſianos errores circa ductum ſalivæ ſuperiorem hiſce diebus detexi, ſed &, qvæ in oculis brutorum obſervata deſcripſi vaſa, in ejuſdem hominis oculis manifeſte notavi, tum ex glandula oculi exteriori in tunicam palpebræ ſuperioris interiorem pergentia, tum a punctis lacrymalibus patentia in nares; de glandula vero lacrymali dicta nihil licuit obſervare.

Eqvinum caput, ut alia varia ſatis egregia, ſic & in cerebro qvæ-

dam in aliis mihi non viſa exhibuit, ut in ventriculo nobili plexum choroidi ſimilem, in hoc ut & ipſo choroide affuſam vaſis ſubſtantiam glandulis ſimillimam; in pineali magnitudinem qvidem ſatis conſpicuam, ſed colorem exterius nigricantem, interius cineritium multis fuſcis maculis diſtinctum, uſqve adeo jam omnia audent omnes, ut ne ipſam qvidem animæ ſedem intactam relinqvat atra bilis. Sed eqvis forte id familiare; idem enim etiam in altero, qvod inde ſecui, eqvino capite deprehendi. Certe qvo plura tum aliorum animalium, tum varii generis avium aperio cerebra, eo minus animalibus convenire ingenioſiſſima & actionibus animalibus explicandis admodum alias conveniens cerebri animalium a Nobiliſſ. *Carteſio* excogitata fabrica videtur. Id qvod aliarum rerum in cerebro obſervatarum expoſitione oſtendere facile eſſet; niſi eædem obſervationes, cum maximam partem fuerint veſpertinæ, nec raro nocturnæ, multum adhuc noctis in ſe haberent; niſi eædem, propter ordinarias occupationes interruptæ, multas multis in locis oſtenderent lacunas; niſi denegatus mihi Pluti favor id egiſſet hactenus, ut ex iis, qvæ plurima in eum finem indies video agenda, pauciſſima præſtiterim. Sed fovenda hæc ſunt, donec otium & opes acerbos modo fructus ad maturitatem qvandam perduxerint. Vale, Clariſſime Vir, & favere perge

Tibi

addict.

Raptim *Leidæ* A. 1663. diſcip.
5. Mart.

NICOLAO STENONIS

XII

LYMPHATICORUM VARIETAS

XII

IN canibus obſervata varietas circa lymphaticorum concurſum cum vena cava in ſiniſtro latere colli conſiſtit tum in ramis inſertionum, I, qvi modo plures ſunt, modo pauciores, tum in annulis, K, qvi vel omnino deſunt, vel adſunt qvibuſdam plures, aliis pauciores, interdum anguſti, nonnunqvam admodum ampli, ut figuras inſpicientibus patet.

Fig. 1. debetur diligentiæ amiciſſimi D. *Swammerdamii*, 2 & 3, parum diſtincte qva inſertionem a me præparatæ, ſingularum peculiares explicationes ſupervacuas judicavi, cum eadem communis omnium explicatio ſufficiat:

Venæ cavæ, A, *truncus ſupra cor.*
B. *Ramus jugularis.*
C. *Axillaris ramus.*
D. *Ramus tendens in poſteriora colli.*
E. *Ramus tendens in interiora colli.*
F. *Lymphatica colli.*
G. *Lymphatica ſiniſtri pedis anterioris.*
H. *Lymphaticorum infra jugulum communis truncus, dictus Thoracicus.*
I. *Rami, qvibus lymphatica continuantur cavæ.*
K. *Annuli lymphaticorum, per qvos ut plurimum vel vaſa vel nervi tranſeunt.*
L. *Lymphatica ab inteſtinis & hepate.*
M. *Lymphatica a lumbis & pedibus poſterioribus.*
N. *Glandulæ conglobatæ.*

Varietas Lymphati corum

Obs. 97.

Fig. 2.

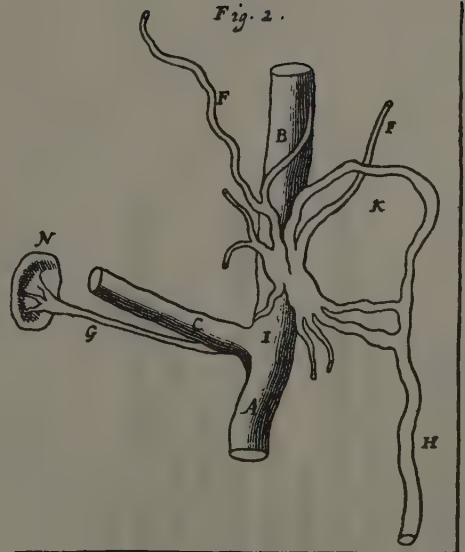


Fig. 3

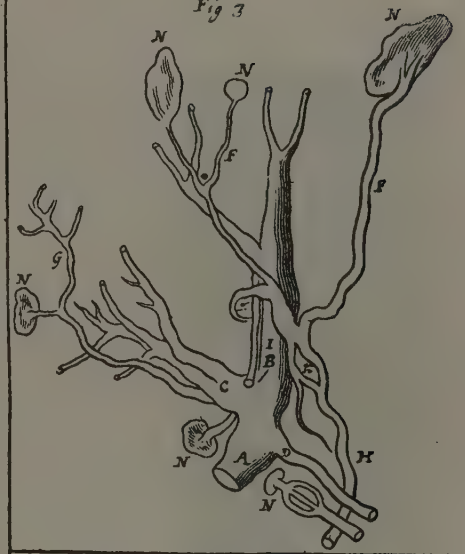


Fig. 4.

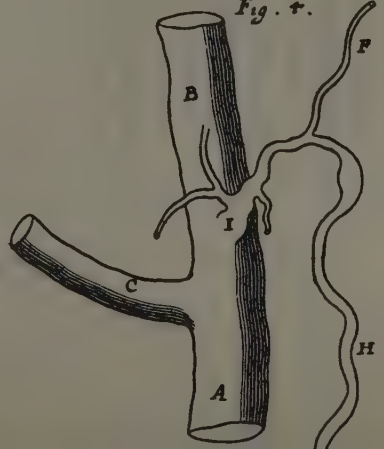


Fig. 5.

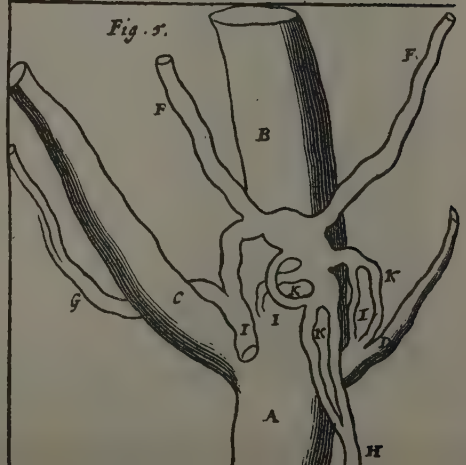
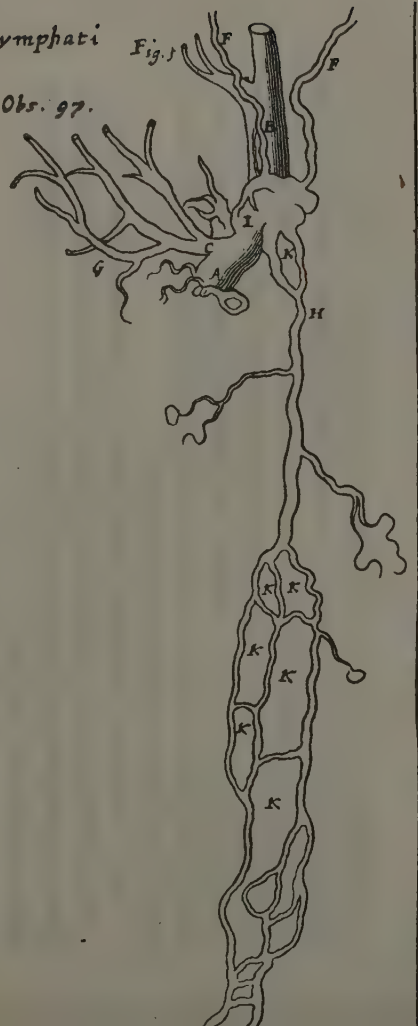


Fig. 1



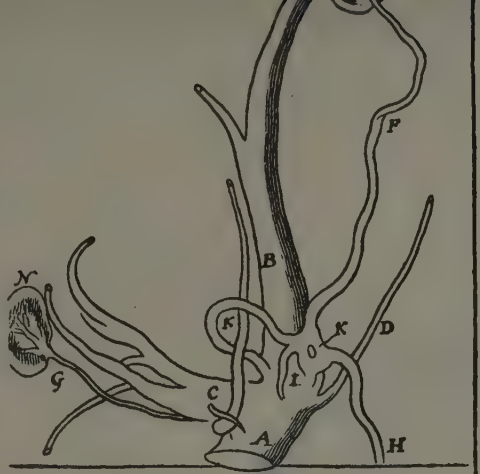
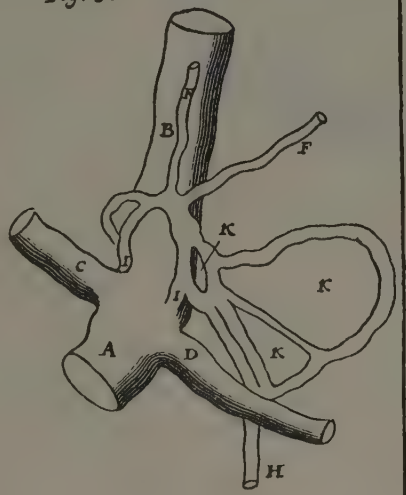


Fig. 8.



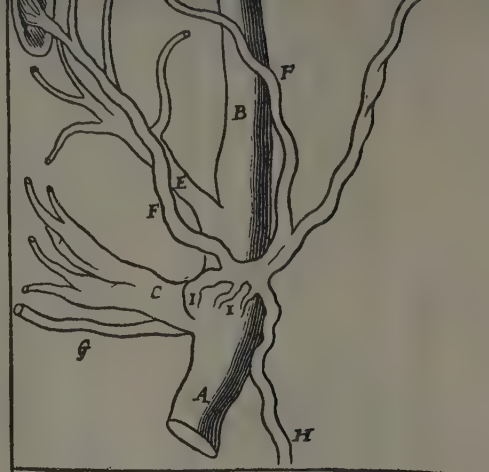
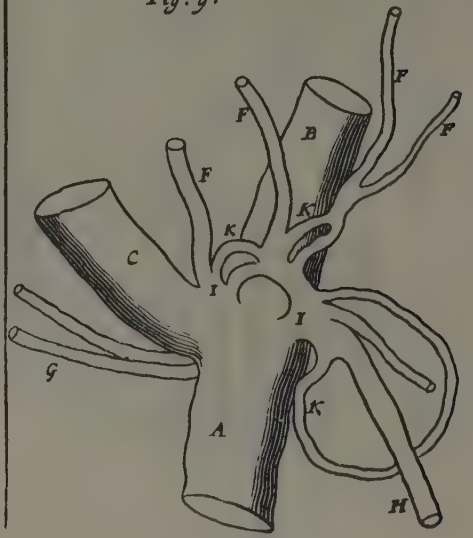


Fig. 9.



Cum ejuſdem generis vaſa in eadem ſpecie animalium tam inſignem in diverſis individuis admittant varietatem, facile patet, omnium opificem Deum inter alia ex corpore animalium agnoſcenda Divinitatis attributa etiam hæc duo voluiſſe nobis proponere, ſe ſcilicet nec caſu ferri, cum a conformationis generalis regula non aberret, nec adſtringi ulla neceſſitate, cum particulares conditiones pro arbitrio in individuis mutet.

XIII

APOLOGIÆ PRODROMUS, QVO DEMONSTRATUR, JUDICEM BLASIANUM & REI ANA= TOMICÆ IMPERITUM ESSE, & AFFECTU= UM SUORUM SERVUM

VLTRAJECTI liber hiſce diebus prodiit, cujus fronti hæc leguntur inſcripta: *Novus Ductus Salivalis Blaſianus in lucem protractus a* Nicolao Hoboken. Si præfationem conſulis, pollicetur illa in hoc libro invenienda, *qvæ Candidum Lectorem edocere poſſint, certumqve reddere inventionis primæ Ductus Salivalis non ita pridem ex maxilla ſuperiore feliciter eruti;* & id qvidem ita, *ut ex iiſdem judicari poſſit, qvo jure & animo nuper* Nicolaus Stenonis *ſibi eam aſſumere &* Blaſio *derogare conatus ſit.* Ipſum opus ſi adis, judicii qvaſi formam vides, ubi *Blaſius* accuſator, Ego reus, *Hoboken* judex: parum enim fuerat *Hobokio* iſti edidiſſe *Blaſii* epiſtolam, niſi ſimul in hominem ſibi ignotum cenſoriam ſtrinxiſſet virgulam, & de re ſibi æqve ac *Blaſio* cognita judicium præcipitaſſet.

Blaſius (id qvod in ipſa Apologia verbis *Blaſii* ſum demonſtraturus), ſe *Achilli,* me *infelici puero comparando,* accuſat me *furti, ingrati animi, injuſtitiæ, mali moris, erroris, nugarum, infidelitatis, inhumanitatis, mendacii, falſitatis, calumniæ, cavillationis, malitiæ, arrogantiæ, perverſitatis, audaciæ, inverecundiæ, impudentiæ, ſtultitiæ, improbitatis.* En catalogum titulorum! Ecce honeſta *Blaſii* verba! Qvis hæc a Profeſſore, imo qvis ab ullo viro honeſto in cauſa nondum probata exſpectaſſet?

Verba, in qvibus hæſit animus Judicis noſtri, *damnant me, ut arrogantiæ ſtimulis impulſum, ut mei immemorem, ut officii, gratitudinis reverentiæqve amico, hoſpiti, imo Præceptori pluſqvam amiciſſimo debitorum jura infringentem & violantem, damnant conatus meos, ut tales, qvi, licet exordio ſpecioſiſſimi ſint &c., tandem tamen, fuco larvaqve*

detractis, injuriæ factæ conſcientiam pudoremqve authori, ſi ingenuus modo ſit, creare ſolent; & ne relinqvat, qvo adſcendere poſſit ulterius, *fallacem me* Sinonem & *Proditorem* Anagrammate publice proclamat. Agnoſcite hinc animum judicis ab omni affectu vacuum.

Ipſum controverſiæ ſtatum, unde hæc omnia promanarunt, ſi ſcire aves, hic eſt: *an in collegio privato aliave occaſione Ductum Salivarem in* Obſervationibus Anatomicis *a me deſcriptum, aut ullam ejus partem* Blaſius *mihi demonſtraverit?* Aſſerit *Blaſius,* ejusqve ſimplicem aſſertionem pro demonſtratione admittens *Hoboken* ſententiam ſuam pronuntiat. Hæc inde qvæſtio peperit aliam, ſc. *an* Blaſius, *anteqvam ipſi demonſtrarem, qvicqvam eo de ductu ſciverit?* imo *an ullam diſtinctam ejus habuerit cognitionem, anteqvam meæ prodiiſſent theſes?* Scilicet viſum mihi, ut in *Obſervationibus Anatomicis de Oris Glandulis* th. 13. dixi, ductum qvendum D. *Blaſio,* cum in ædibus ejus viverem, oſtendi, qvo, qvid eſſet, non ſignificante, ſeptimo inde menſe Lugduni Clariſſ. Præceptores meos conſului, numqvid eundem ante vel ipſi obſervaſſent, vel ab aliis vidiſſent deſcriptum. Re perſpecta & in homine etiam detecta publice eum primo in eo, qvod Noſocomio adjacet, Theatro Clariſſ. Dn. *Sylvius,* inde itidem in magno Theatro Clariſſ. Dn. *van Horne* demonſtrarunt, meum ſimul nomen, qvæ illorum fuit humanitas, commendando. Audiens hoc *Blaſius* integro fere ab inventione anno nominatis modo Præceptoribus meis Celeberrimis ſignificat, ſe illum ductum & inveniſſe primo, & mihi demonſtraſſe; mox *Medicinæ Generalis Ideam* edit, in cujus præfatione eundem illum ductum a ſe inventum proclamat. Nempe *Blaſius,* mihi ulteriorem peregrinationem meditanti occaſionem in ea inqvirendi defuturam ratus, me Lugdunum digreſſo in collegiis ſuis ductus ejus, tanqvam proprii inventi, fecerat mentionem (veram enim demonſtrationem ab illo nunqvam factam ductus Blaſiani ſeu ductus ſalivaris imaginarii, demonſtrabit deſcriptio, qvin & facta nuper Muidæ ab eodem ſectio, in qva eum fruſtra ab eodem qvæſitum audio, evincit). Inde cum Lugduni hoc agi audiret, vel ſemet prodere, vel me tenebatur accuſare, qvorum illud pudor vetabat, huic reclamabat conſcientia. Vicit tandem pudor, ſed qvam felici cum ſucceſſu, exitus evincet. Ego, nihil minus qvam hoc a *Blaſio* exſpectans, licet & alia ſe offerrent, qvibus contrarium potuiſſem demonſtrare, unico hoc tantum adverſus illum uſus ſum argumento. Qvod ſi *Blaſius* integro a prima inventione anno in libro, qvem

Ampliſſimis Reip. Amſtelod. Conſulibus & Theſaurariis Ordinariis dedicavit, in qvo primum ſe ejus ductus inventorem publico indicat, in qvo novi nihil præter eundem afferri profitetur, in qvo Whartoniani ductus & ortum determinat & exitum, ductus, qvem ſibi vindicat, nec verum ortum determinat, nec exitum, imo glandulam, unde oritur, uſui alii ignobili deſtinat; non poterit dici ejuſdem ductus ortum ſcire vel exitum, nedum ductum illum alteri demonſtraſſe, multo minus inveniſſe. Atqvi *Blaſius,* &c: Ergo. Hujus ego argumenti ſolam aſſumptionem in theſibus meis ſumpſi probandam, miſſis omnibus aliis, qvæ, *Blaſium* inter & me geſta, pro me licuerat afferre. Hæc mea eſt malitia, hæ calumniæ, hæc improbitas, hæc proditio; hoc ego nomine a *Blaſio* accuſor, ab *Hoboken* damnor. Si vir eſt *Blaſius,* probet ullo vero argumento, me contra ſe vel egiſſe qvicqvam, vel dixiſſe, qvod non coram legitimo Magiſtratu paratus ſim defendere: qvod ſi vero res, qvas affero, cuiqvam forte videantur acerbiores, committenti eas, non enarranti, id adſcribendum. Niſi conſcius recti animus honeſtatem infra duceret a carentibus ratione dicteriis turbari, talionis jure ſua in utrumqve retorqverem. Sed abſit id agerem, ut rixantes inter aniculas in foro ſe verſari crederent Lectores. Vindictam ego aliis, imo legitimo Magiſtratui, reſervabo integram, contentum hic in mei defenſionem qvædam propoſuiſſe, in ultionem nihil.

Si Judex noſter utriuſqve conſenſu fuiſſet electus, aut ſaltem perſona, qvam ſuſtinet Amſtelodami *Blaſius,* dignus, oſtenderem hic illi, qvænam ingentia illa fuerint beneficia, qvæ plenis mihi buccis exprobare non erubeſcit *Blaſius;* qvid in commendatitiis litteris primis meo nomine a *Blaſio* petierit *Bartholinus;* qvibus me artibus *Blaſius* ſibi reddiderit hoſpitem; qva in re habuerit diſcipulum; qva ſolertia id egerit, ut, dum ſub illo præter vulgares & nudas operationes Chymicas nihil diſcerem (jam tum enim integro, & qvod excedit, triennio a Clariſſ. Viris D. *Simone Paulli,* Dn. *Th. Bartholino,* Dn. *Backmeiſtero* aliisqve Medicinæ tum candidatis, tum ſtudioſis ea in Anatomicis, ut taceam cætera, videram, qvæ apud *Blaſium* fruſtra qværerem), perderem interea occaſionem diſcendi, qvæ plurima Lugduni non in Medicina modo, ſed & in aliis Medico neceſſariis artibus, licuiſſet a fine hyemis ad caniculares uſqve ferias, optimo ſcilicet totius anni tempore, addiſcere a Viris toto Orbe ob experientiam ſuam & ſcientiam celebratis.

Hæc, inqvam, omnia & ſingula Judici noſtro qvam evidentiſſime demonſtrarem, ſimulqve exponerem, cum tandem has *Blaſii* artes penitius pervidiſſem, qva facilitate omnia tulerim, qvam amice de *Blaſio* ſemper fuerim locutus, etiam cum hæc in me moliri inceperet, idqve omne in amicorum ipſius gratiam.

Inde ulterius pergerem, & 1. demonſtrarem, *Blaſio* ductus a me deſcripti notitiam nullam fuiſſe ante triennium ab II. Calend. Jul. Anni 1662. numerando, nec cum Amſtelodamum accederem, nec cum *Medicinam General.* ederet, nec cum epiſtolam Dn. *Bartholino* ſcriberet, nec cum eandem ſuperiori anno ad *Hoboken* tranſmitteret; 2. ex ipſa *Blaſii* epiſtola luce meridiana clarius redderem, *Blaſium* non intelligere, vel qvid de maxillaribus & parotibus dicat *Whartonus,* vel qvid ex eodem de iiſdem ipſe *Blaſius* in *Medicina Generali* per compendium deſcripſit, vel qvanti glandularum diſtinctio Sylviana ſit momenti, vel qvæ de ſalivaribus a me propoſita, vel qvid ipſa de iis doceat Anatomia.

Sed cum alium Profeſſoria *Blaſii* dignitas reqvirat Judicem, cum æqvitatis legibus repugnare videatur ad illius tribunal cauſam deferre, qvi nec rei, de qva agitur, peritiam ullam habet, nec ſuos frenare novit affectus, convenientiori hæc omnia loco & tempori reſervabo.

Hic itaqve ad Judicem noſtrum reverſus, licet parum amice, imo parum honeſte ab illo exceptus, nihil in illo ſolam præter credulitatem accuſabo, ut qvem puto perſvaſum habuiſſe, ab amico nihil falſi exſpectandum, ab Anatomico tanta cum fiducia errores Anatomicos non potuiſſe proponi. Credulitatem vero, ſeu cœcum potius amici ſui amorem, ſeqvuta eſt, neglecto rei examine, ſententiæ præcipitatio.

Si enim utriuſqve examinaſſet verba, ſimulqve ad partes autopſiam vocaſſet, non dixiſſet, *me mihi Blaſianum adſcripſiſſe ductum,* non *promiſiſſet Lectoribus ex iſta* Blaſii *epiſtola certitudinem inventionis ductus maxillaris exterioris,* ſed potius *errores* Blaſii *Anatomicos obſervaſſet, & manifeſtiſſima deſiderati candoris Blaſiani inveniſſet ſpecimina.*

DUCTUS SALIVARIS IMAGINARIUS, SEU DUCTUS VERE BLASIANUS, EX *BLASII* SCRIPTIS ERUTUS.

Oritur a maxillaribus internis (*Med. Gen.* p. 63.) ſeu eadem glandula, ex qva oritur inferior, ſed non præciſe ex uno loco (*Duct. Blaſ.* p. 31.). Per glandulas haſce non intelligit maxillares exteriores (*D. B.* p. 34.), nec qvas parotidum nomine deſcripſit in *Med. Gen.*

(*D. B.* p. 39.), ſed qvæ a parotidibus uſqve ad mentum ſeſe varia magnitudinis colorisqve ſpecie exhibent (*M. G.* p. 23.), ſeu qvæ cum maxillari interna ſit una & eadem, nec inde ſecerni poſſit, niſi velimus unum qvid in duas tresve partes dividere (*D. B.* p. 32.); qvæ maxillis non incumbit, ſed iiſdem ſubſtrata eſt æqve, imo magis, qvam qvidem maxillares internæ (*D. B.* p. 40.), cujus rudimenta qvædam auriculam cingunt (ib.), qvæqve cavitatem ſub auricula ſe exhibentem ſatis profundam replet (*D. B.* p. 52.).

Defert ſalivam ad glandulas oris anteriores, & ita qvidem, ut inde motu lingvæ exprimi ea poſſit (*M. G.* p. 64., *D. B.* p. 45.), ibiqve eſſe non modo unum foramen amplum, & papillari excreſcentia munitum, ſed & alia magis inconſpicua, qvibus ab eodem ductu provenientes propagines gaudent (*D. B.* p. 37. & p. 48.). Foramen illud, ex ſuppoſito ſaltem, dentibus anticis minus vicinum eſſe foramine alterius ductus (*D. B.* p. 42.), ad eaſdem anteriores glandulas etiam a parotide Blaſiana per vaſa lymphatica ſalivam devehi ſuſpicatur (*D. B.* p. 50.). In diſputatione habita anno 1661. 8. Jul., qvam citat *D. B.* p. 36., ait: inferiorem excurrere ad inferioris maxillæ extremitatem, circa menti inferiora, ad latus frenuli lingvæ, ſuperiorem vero excurrere ad maxillæ ſuperioris latus, non determinando, intrane dentes an extra, in buccis an alio in loco: in ipſa vero epiſtola ad D. *Bartholinum* proximo inde menſe ſcripta p. 23. mentionem facit egreſſus ad buccas.

Scilicet, qvas, cum diſputationem haberet, non viderat theſes meas, ante ſcriptam epiſtolam legerat, ut ipſe pagina 37. fatetur, dum ait: *Habita hæc diſputatio eodem die, qvo caſtigatoria D.* Stenonis, *nempe* 8. Jul., *cum ne qvidem videram Diſputationem Stenonianam, ne ex eadem mea hæc deſumpta forte exiſtimetur.* Egregia ſane admonitio, & technas *Blaſii* ipſius *Blaſii* confeſſione qvam elegantiſſime detegens: nempe qvi diſputationem, in qva exitum nondum poterat determinare, fatetur habitam, anteqvam mea vidiſſet ſcripta, ex meis & theſibus & figuris hæc duo didicit, 1. glandulam, unde oritur ductus, foveam ſub auricula replere. 2. ductum ad buccas egredi, qvem ſua in diſputatione ad latus maxillæ ſuperioris tantum excurrere dixerat, nihil omnino determinando. Sane in ſupervacuo laborat Dominus *Blaſius* p. 35., cum ait, *qvæ in diſputatione adduxit, non ex Diſputatione Stenoniana deſumpta, ſed vero ex diſſectionibus animalium obſervata.*

Dolerem enim, ſi tam craſſos, ac ibi ponit, errores ex theſibus

meis didiciſſet; an vero eoſdem ex animalium diſſectionibus potuiſſet haurire, judicabunt periti.

Hic ortus, hic exitus eſt ductus Blaſiani: ne vero de obſervationis veritate dubites, tertius jam ab inventione annus agebatur, cum *Blaſius* epiſtolam ſuam ad *Hobokii* ſubſellia ſubmitteret, eo ipſo demonſtrans, ſe adhuc eandem tueri opinionem, qvam, cum D. *Bartholino* eam tranſmitteret, fovebat. Imo in ipſa illa epiſtola, poſt ſeſqviannum ab inventione ſcripta, p. 23. fatetur, *rem eſſe facilis indaginis: eo qvod obvia ſatis ſint, non minus qvod ſuperius dicitur, qvam qvod inferius, brevia, denſa rupturæqve minus obnoxia;* mox de me addit: *qvod ſi facilis adeo res ei, qvi nunqvam vidit, unde difficultas ei, qvi ſæpius aliis demonſtravit;* inde. p. 35. ait: *Admovi inqviſitioni manum, imo qvam ſæpiſſime, & qva veritate dixerim, utrumqve Ductum Salivalem ex glandulis maxillaribus originem ſumere, facile inveni. Diſſectionibus Anatomicis omni tempore pro Collegiis Anatomicis occupatus, qvi potui omittere, ut non in ea, qvæ primus omnium orbi indicaveram, inqvirerem, adeoqve nomen meum tuerer, maxime cum detrahere illud mihi, qvem Dei opt. max. auxilio emergere vident altius, plurimi allaborent?*

Cum itaqve & res facilis, & tempus longum, & occaſio freqvens, & cauſæ fuerint urgentes, verum oportet hunc credamus eſſe ductum Blaſianum.

Videamus, an idem ille ſit, qvem ego deſcripſi.

Blaſianus Ductus.	*Qvem Ego Obſervavi.*
Oritur a maxillaribus internis.	Oritur non a maxillaribus internis.
Seu ab eadem glandula, a qva oritur inferior.	Non ab eadem glandula, a qva oritur inferior.
Non ab illis, qvas in *Medicin. Gen.* parotidas appellat *Blaſius.*	Sed ab illis, qvas in *Medic. Gen.* parotidas appellat *Blaſius.*
Sed ab illis, qvæ a parotidibus uſqve ad mentum varia coloris & magnitudinis ſpecie ſe exhibent.	Non ab illis, qvæ a parotidibus uſqve ad mentum varia coloris & magnitudinis ſpecie ſe exhibent.
Qvæ glandula & *cavitatem ſub auricula replet profundam ſatis,* & tamen a maxillari interna non poteſt ſecerni, niſi unum qvid in duas tresve partes velimus ſecare.	A glandula, qvæ *cavitatem qvidem ſub auricula replet, profundam ſatis,* a maxillari tamen interna facillime poteſt ſecerni, cum duæ diſtinctæ ſint glandulæ, per

intercedentem membranam, ſæpe etiam pingvedinem, ſatis conſpicue a ſe mutuo ſeparatæ.

Qvæ maxillis non incumbit, ſed iis magis ſubſtrata eſt, qvam maxillariis interna.

Qvæ maxillis incumbit, nec illis ſubſtrata eſt.

Excurrit ad latus maxillæ ſuperioris, & terminatur ibi (ait enim: inferior excurrit ad latus frenuli lingvæ, ſuperior ad latus maxillæ ſuperioris).

Non excurrit ad latus maxillæ ſuperioris vel in homine, vel in brutis, utpote in buccis exitum inveniens.

Defert ſalivam ad glandulas oris anteriores, ut ea inde motu lingvæ exprimatur.

Non defert ſalivam ad ullas oris glandulas, ſed per ſuum oſtium immediate excernit.

Ibiqve habet non *modo foramen unum amplum* papillari excreſcentia munitum, ſed & alia magis inconſpicua.

Habet unicum tantum *foramen amplum*, papillari excreſcentia munitum in qvibuſdam, in multis hominibus in medio buccæ plano ſine ulla eminentia; præter hoc vero nulla alia foramina.

Ad buccas egreditur.

Ad buccas egreditur.

Qvis non hinc manifeſte agnoſcit, qvo jure *Blaſius* me ductum a ſe inventum, totiesqve & tam urgentes ob cauſas examinatum, mihi dicat attribuere? qvo jure me apud Lugdunenſes Profeſſores Celeberrimos accuſarit? qvo jure conatus fuerit me publicæ ignominiæ exponere? Sed & cui non inde manifeſtum eſt, Judicem noſtrum neglecto cauſæ examine ſententiam præcipitaſſe, cum me mihi *Blaſii* labores attribuiſſe diceret, & inde ſe in convitia diffunderet? Prudentior *Æſopi apud Phædrum Veſpa* erat, qvæ, Apes inter & Fucos ſententiam pronuntiatura, *ex ſapore mellis & forma favi* dignoſcendum Authorem judicabat.

Sed videamus certitudinem inventionis, qvam noſter nobis Judex promittit. Licet enim veriſſimum ſit, Blaſianum hunc ductum *Blaſii* inventum eſſe, &, anteqvam ex cerebro *Blaſii* prodiret, a nemine obſervatum, cum tamen non ſufficiat ſcire verum, niſi & cauſas, qvibus inducti illud verum admittimus, ſimul fuerint cognitæ, videamus, qvænam illæ fuerint cauſæ, qvæ *Hobokium* coegerunt, ut

non modo crederet ipſe, a *Blaſio* inventum Blaſianum, ſed & aliis idem conaretur perſvadere.

Certe epiſtolam evolvendo vides *Blaſium* dicere, ſe inveniſſe, ſe mihi demonſtraſſe, & ſimul teſtimoniis diſcipulorum biennio, imo cujuſdam triennio, poſt habita collegia ſcriptis probare, ſe illis eum demonſtraſſe. Scilicet, qvia *Blaſius* dicit, ſe inveniſſe, qvia ſcriptis qvibuſdam teſtimoniis diſcipulorum probat, ſe a tam longo tempore demonſtraſſe, ergo certi ſumus, *Blaſium* inveniſſe, ergo & certi ſumus, *Blaſium* mihi eum demonſtraſſe: ac ſi hæ eſſent demonſtrationes Mathematicæ, qvibus nihil poſſit reponi. Non hic exponam, qva ratione ipſi ſua explicent teſtimonia, cum id in ipſa reſponſione acturus ſim, tantum, ut omnibus pateat, qvanti ſimplex *Blaſii* aſſertio facienda, alias demonſtrationes ex eadem *Blaſii* epiſtola adducam.

Si *Blaſio* ut Anatomico, ut Viro honeſto & veraci credendum, cum ait, rem non modo levem eſſe, ſed & a ſe ſæpius examinatam, & qvidem, ut tueretur nomen ſuum, maxime in re, qvam primus Orbi detexit; eidem etiam *Blaſio* credendum, cum, qvæ de proprio invento, toties a ſe tamqve urgentes ob cauſas examinato, obſervata ſibi enarrat. Atqvi *Blaſio* non credendum eſt, cum enarrat, qvæ ſibi de proprio invento, toties a ſe tamqve urgentes ob cauſas examinato, obſervata; concludat itaqve ipſe Lector, qvo nomine *Blaſius* ſalutandus. *Blaſii* autem obſervationibus non credendum eſſe, admittent omnes, qvi, qvæ manifeſtæ experientiæ repugnant, aperte falſis judicant annumeranda, e qvo genere ſunt hæc ex *Blaſii* ipſius epiſtola deſumpta.

ERRORES ANATOMICI IN DESCRIPTIONE DUCTUS BLASIANI A *BLASIO* COMMISSI.

P. 31. & 32. conglomeratas parotides a maxillaribus internis non poſſe diſtingvi, niſi unum qvid in duas tresve partes dividere liceret.

Ibid. ex maxillaribus internis ſalivarem ſuperiorem æqve ac inferiorem originem ſuam ſumere, licet non præciſe ex uno loco.

P. 32. eam eſſe maxillarem internam, ejusve partem, qvam ego conglomeratam parotidem appello.

P. 37. & 44. ductum exteriorem, præter unum foramen in extremo ſui notabile, alia inconſpicua magis habere, qvibus ab eodem provenientes propagines gaudent.

P. 39. qvas in *Medicina Generali* deſcribit parotides, non eſſe eas,

qvas *Whartonus* deſcripſit nomine parotidum, & ego conglomeratas parotidas appellavi.

Ibid., qvas in *Medicina Generali* deſcribit parotides, eſſe parotides, qvas ego conglobatas appello.

P. 40. parotidis conglobatæ ulla rudimenta, etiamſi de parte ejus inferiore intelligas, auriculam cingere.

Ibid. conglomeratas parotidas maxillis æqve, imo magis, ſubſtratas eſſe, qvam qvidem ipſæ maxillares internæ ſunt.

P. 43. & 45. glandulas dari, ad qvas exterior ductus ſalivam deferat inde motu lingvæ exprimendam.

P. 50. a parotidibus conglobatis deferri ſuccum qvalemcunqve ad glandulas anteriores magis iis, ad qvas ductus ſalivalis pertingit.

P. 52. parotides Blaſianas, ſi conglobatæ ſunt, ut ipſe ſupra appellat, ſubſtantia cum maxillaribus convenire.

Horum omnium falſitas amicis, qvorundam etiam publico, innotuit, &, ne ulla ulli relinqvatur ſuſpicio, adhuc me eadem demonſtraturum ſiſto. Prodeat modo *Blaſius*, & in præſentia Judicum Amſtelodamenſis Profeſſoris dignitati convenientium in alterutro latere capitis, vel humani vel bruti, hæc demonſtret, ego in oppoſito latere contrarium demonſtrabo.

Primum hoc Blaſiani Candoris ſpecimen, audite & alterum.

Ductus Blaſiani p. 48. ait, ductum ſalivarem a ſe ante meum adventum demonſtratum, juramento confirmari poſſe. Ergo vel in glandulis maxillaribus internis ortum, vel in glandulis oris anterioribus exitum demonſtratum, juramento confirmabitur: atqvi talis nec ortus datur, nec exitus; ergo juramento confirmabitur, a *Blaſio* demonſtratum id, qvod nec a *Blaſio*, nec ab ullo viſum eſt, utpote non exiſtens. Qvi *Blaſium* hactenus non noviſtis, ex hiſce duobus argumentis, qva fide vir ſit, diſcite, donec in ſua apologia ingenium ejus nudum inſpexeritis, nudum, inqvam, nulla enim epithetorum amarulentia illud onerabo, contentus ſolas geſtorum hiſtorias recitaſſe, ut pateat omnibus, tantum apud me valere Amſtelodamenſis Athenæi ſplendorem, Profeſſoriæ perſonæ dignitatem, maxime vero modeſtiæ amorem, ut, licet tot ab illo convitiis oneratus, ne unicum qvidem reponam.

Cum itaqve Judex noſter nec deſiderati candoris Blaſiani ſpecimina agnoſcere, nec errores Anatomicos obſervare, nec Blaſiani

ductus a meo diverſitatem videre potuerit, patet, eum amico ſuo, utpote in publica dignitate conſtituto, & tanta cum fiducia ſuas obſervationes proponenti, nimium tribuiſſe, adeoqve credulitate hac deceptum id egiſſe, ut, dum verum Ductum Salivarem Blaſianum, ſeu Salivarem Ductum vere imaginarium, in lucem protraheret, ſe ſimul omnium oculis exponeret & *rei Anatomicæ imperitum, & affectuum ſuorum ſervum.*

Et hæc qvidem ſufficiant ad demonſtrandam Judicis noſtri ex præjudiciis ortam ſententiæ præcipitationem, donec otium permiſerit ipſa ea, qvæ & *Blaſius* mihi & *Deuſingius* objecerunt, cum propriis eorundem rationibus examinata omnium oculis exponere, ut eo clarius eluceſcat, qvam facile extra orbitas in devia feratur ratio, ubi laxa ſemel affectibus frena permiſerit.

Lugduni Batavorum, 1663.

XIV

NOVA MUSCULORUM & CORDIS FABRICA

XIV

THOMÆ BARTHOLINO HAFNIAM

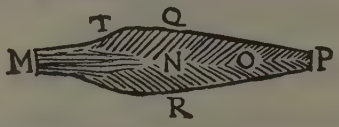
APOLOGIÆ *Prodromum Nicolao Kragio* tranſmiſi tibi offerendum, ſpero rite curatum. A Clariſſimo *Sylvio Diſputationum* de novo impreſſarum aliarumqve de febribus exemplaria qvædam accepi amicis offerenda, qvos inter cum nemo mihi ſit, qvam tu Celeberrime Vir, majori veneratione colendus, hiſce diebus Haf-niam petenti amico tradidi tibi exhibenda. Cætera, in cordis & muſculorum verior ſcrutinio, ſperans brevi, ſi ſufficiens iſti labori otium fata permiſerint, me utriuſqve fabricam cum figuris abſolu-turum. In muſculis qvæ obſervavi, an ab aliis fuerint notata, tua me infinita docebit lectio. Tacebo vaſa, qvæ necdum niſi pauca eaqve non magni adeo momenti exhibuerunt, qvod vero fibras eorundem ſpectat, elegantem earum mirari ſatis neqveo ſtructuram. Qvamlibet ſolam conſiderans fibram carnoſam in medio, in utraqve extremitate videbit nervoſam, id qvod & ſatis vulgare, ſed omni-um junctarum compoſitio mihi viſa rarior. Carnoſa namqve portio non ab uno muſculi extremo verſus alterum recto ductu extenditur, ſed inter latas tendinum expanſiones fertur tranſverſa, ita qvidem ut carnoſarum ſingulæ parallelum inter ſeſe obſervent ſitum. Si enim ab uno muſculi extremo verſus alterum fieret ſecundum fibra-rum ductum ſectio, hæc ſe manifeſtam ſiſtet ſtructura.

A B. *Tendo per unam muſculi ſuperficiem ſe expandens.*
C D. *Alter tendo per oppoſitam ſe ſuperficiem diffundens.*
E E. *Carnoſa fibrarum portio inter utramqve expanſionem extenſa.*

Integri alias ſimplicisqve hæc eſt fabrica.

G H. *Unius tendinis expanſio.*
J K. *Expanſio tendinis oppoſiti.*
L L. *Carnoſus venter.*

Sunt & muſculi compoſiti, iiqve generis non unius; elegantiſſimi mihi viſi, qvorum fibræ hoc modo diſpoſitæ.



P. *Tendinum alter, qvi in duas finditur expanſiones, ſuperior una verſus* Q *diffunditur, altera inferior verſus* R *ſe expandit.*
M. *Alter tendo, qvi per medium ventrem ſuas diſpergit fibras.*
Ab N *ad* O & *porro inter mediam & duas exteriores oppoſitas expanſiones parallelo ductu feruntur carnoſæ fibrarum partes.*

Nec omittenda videtur qvæ cuilibet muſculo peculiaris membrana, cujus fibrarum ſitus tranſverſus & inter carnoſas fibras diffuſio non parum ad motus explicationem conferre videtur. Sed de his, ut & de ſpeciali qvorundam notatu digniorum muſculorum fabrica, brevi plura; hæc enim tantum obiter tibi volui ſignificare, ut, ſi qvid de illis a te vel ſectione obſervatum, vel lectione, liceret tua informatione gaudenti tum laboris compendium facere ſumptuumqve, tum deſcriptionis rationem ſecundum tua dictata dirigere.

Qvod ſubſtantiam cordis ſpectat: evidenter, ut opinor, demonſtratum dabo, nihil in corde reperiri, qvod non reperiatur in muſculo, nec in corde deſiderari, qvod in muſculo invenitur, ſi illa reſpexeris, qvæ ad muſculi faciunt eſſentiam, id qvod & de auriculis patebit verum. Erit & inde manifeſtum, nullas in corde dari fibras vel rectas, vel circulares, vel, ut *Veſalius* deſcribit, obliqvas, ſed unius omnes

generis eſſe, ſimplices puta, qvales in qvolibet alio reperiuntur muſculo, in eo tantum a reliqvorum qvibuſdam differentes, qvod non ſecundum rectam lineam extendantur, ſed, ubi a baſi conum verſus obliqve deſcenderint, iterum ſuperiora verſus dirigant curſum. Omnium autem, ut ſpero, fibrarum utramqve ex autopſia determinabo extremitatem, ſimulqve monticulorum ſeu lacertulorum uſum, valvularumqve ortum, numerum motumqve, & vaſorum naturam ſpectantia non pauca. Videbunt hinc adverſarii tui, qvi figuras in *Anat.* tua *Reformat.* (edit. Lugdun. an. 1651.) p. 245. expreſſas, ſyſtolen cordis & diaſtolen nobis exhibentes, exiſtimarunt evidenti rationi e diametro repugnare, ſe ante victoriam ceciniſſe triumphum, cum ex fibrarum ſtructura reſultans actio ibidem evidentiſſime exprimatur. Sed fefellit illos de parenchymate cordis minus accurata opinio, qva illud ſe veſiculæ adinſtar habere crediderunt, adeoqve, cum brevius redditum intumeſcit, dilatari, cum longius concidit, anguſtius fieri. Qvod vero ibi & ligatura, & diſſectione, & tactu demonſtras, idem & ipſa fibrarum evincit fabrica, unde etiam fere omnium, qvæ ibidem p. 249. a te de cordis in ſuis motibus forma exponuntur, ratio reddi poteſt. Sed & evidens erit, conum non eſſe denſiſſimum, ſed ipſum ejus extremum, qvo loco fibrarum ſuperiora verſus fit intorſio, in corde bubulo aciculæ capite tenuius eſſe. Septum vero an pervium ſit, necdum licuit videre. Cavernulas ſeqvutus clauſas offendi; qvid qvod & exterioribus parietibus ſuæ ſint cavernulæ magnitudine reliqvis non cedentes, ſed & innumerus ille fibrarum per ſeptum decurſus idem videtur diſſvadere.

Vix hæc ſatis, ut vides, properanti exarata calamo, cum ecce mihi a te litteras, qvibus etiam paucis, anteqvam de tabula manum, reſpondendum.

Cavæ motum inſpirationi reſpondentem a Domino *van der Lahr* credideram inventum, ſed inde tribus illam deberi inventionem didici, *Padbrugio, van der Lahr* & *Beckero,* qvi ſimul ſectioni tum temporis inſtitutæ intererant. Qvod compreſſionem vicinarum partium in inſpiratione depreſſarum ſpectat, locum hic non poterit illa invenire ſuſpicio, cum & in collo & in abdomine ab omnium alias incumbentium vicinia liberata vena nihilominus ita evacuetur, ut latera ejus ſe mutuo contingant; nec qvam preſſioni opponis, difficultas urgere videtur, cum non reqviratur, ut tunicas venæ in thorace pervadat aër; ſed tantum, ut in venis extra thoracem exſiſtens ſangvis dilatatam intra thoracem venam ingrediatur. Preſſioni vero

ut faveam, ſeqventia qvaſi cogere videntur. Extra omnem namqve controverſiam eſſe puto, aërem, cum a pellente qvocunqve vim patitur, vel denſari eodem, in qvo eſt, loco, vel alium in locum propelli: ad condenſandum autem magnam reqviri vim mechanica docet, & experientia evincit, condenſationem nunqvam ſuccedere, niſi preſſum aërem ambientia corpora omnia ad reſiſtendum ſatis fuerint valida; qvod ſi autem vel minima pars ambientis reſiſtendo fuerit impar, illico a trudente cauſa propulſus aër, qva elabatur, invenit rimam. Qvod ſi itaqve, dum diductæ a ſe mutuo coſtæ deſcendensqve diaphragma externo aëri vim inferunt, qvantum exterior ſuperficies aërem premit, tantum ei cedant qvædam in thorace contentæ partes, neceſſarium exiſtimarem, non denſari aërem, ſed eo pelli, ubi minorem invenit reſiſtentiam. Qvæ autem cedunt, illa ſunt, qvæ thorace diſtento dilatantur, ut pulmones, & thoracem intra exiſtens cavæ truncus; ut itaqve pulmones aër diductos implet, aut ipſe potius non reſiſtentes diducit, ſic & extra thoracem exſiſtens ſangvis, cedentem cavæ intra thoracem tunicam ut diſtendat, eo tanqvam verſus locum ſibi non reſiſtentem propellitur. Qvod ſi mea me hic fefellerit ratio, & a vero abduxerit, tuis in viam reduci deſiderarem rationibus.

D. *Hobokium* ſuas tibi in defenſionem *Blaſii* ſcriptas miſiſſe litteras, miror. Certe & ſibi conſuluiſſet & *Blaſio* ſuo, ſi impreſſionem diſſvaſiſſet; jam vero ut *Blaſius* ſic & ille demonſtrarunt, illorum demum maximam eſſe temeritatem, qvorum minima eſt experientia: nec credo, in vaſtis ſæpe voluminibus tot inveniendos errores, qvot ibi in proprii inventi defenſione committit *Blaſius*, ſuoqve *Hobokius* aſſenſu confirmat. Miſeret me *Blaſii*, qvi lingvam ante manumqve non potuit frenare, qvam ſuis ipſe ſcriptis ſuam publico manifeſtam reddidiſſet indolem honeſto homino parum convenientem.

Qvod eqvos attinet muresqve, nec illorum inde crania, nec horum aperire licuit uteros.

Pro promiſſa *Diatribe* gratias ago maximas. Salutat te Clariſſ. *Borrichius*. *Deuſingius* antiqvum obtinet, & Celeberr. *Sylvio* graviſſima minatur; ſed bruta hæc fulmina ſvavi riſu illi Vir moderatiſſimus contemnit. Plura non licet addere. Vale & ama

T.

Leidæ ult. April. diſcip.
Anno 1663. NICOLAUM STENONIS

XV

DE MUSCULIS & GLANDULIS OBSERVATIONUM SPECIMEN

Musc:
Lingu:
Nicolai Stenonis
OBSERVATIO-
NUM
ANATOMICARUM
specimen.
Lymph
Arteh

SERENISSIMO AC POTENTISSIMO
PRINCIPI ET DOMINO,
DOMINO

FRIDERICO TERTIO,

DANIÆ, NORWEGIÆ, WANDALORUM GOTHORUMQVE REGI; DUCI SLESWICI, HOLSATIÆ, STORMARIÆ ET DITHMARSIÆ; COMITI IN OLDENBURG ET DELMENHORST,

DOMINO MEO CLEMENTISSIMO,

Qvæ mihi hactenus in Anatomicis videre contigit, his paucis comprehensa, qvam humillime offero

Subditus devotissimus
NICOLAUS STENONIS

XV

INEUNTE vere ſuperioris anni cum, qvæ circa cordis fabricam Anatome, divina favente gratia, mihi tum temporis detexerat, Clariſſimorum Amicorum voluntati ut ſatiſfacerem, privatis ſectionibus variis & Leidæ & Amſtelodami demonſtrarem; pollicebar iiſdem, me ſuis ſingula figuris illuſtrata publicæ luci proxima occaſione expoſiturum. Ad qvod eo felicius perficiendum cum ſuam mihi operam ex iiſdem nonnulli liberaliter offerrent, volui & ego, qvantum in me, mea eo ſtudia dirigere omnia, ut, cujus principia tantis Viris non diſplicuiſſe obſervavi, id ipſum plenius pertractatum omnium examini, qvam liceret, breviſſimum intra tempus ſubmitterem. Sed licet omne moverem ſaxum, licet, qvam mihi præſtiterint, humanitatem, qvæ ſuis in noſodochiis hoſpiti ſubminiſtrarint ſubſidia, nunqvam ſatis laudare poſſim, non licuit mihi eſſe tam beato, affecta ut perficerem, tum qvod varia me inde avocarent commodiſſimo ſectionis tempore impedimenta, tum maxime, qvod ipſa inqviſitio, exſpectationem præter, plurium rerum ſecum traheret indaginem. Habent enim hoc rerum naturalium examina, ut nihil adeo ab aliorum commercio judicetur alienum, qvod non multorum una ſecum involvat conſiderationem; & qvo diutius inhæres ſingulis, eo in omnibus plura deſideres, uberiorem in omnibus inqvirendorum offendas materiam.

Prima cordis ſectio hæc mihi revelavit: 1. Nullum in corde a fibris diverſum parenchyma; 2. nullam in cono deſinere fibram,

ſed intortas circa illum ſingulas oppoſito, qvam deſcenderant, loco adſcendere. Inde eorundem in aliis confirmationem qværenti [3.] occurrebat fibrarum ductus, qvem in omnibus eundem notabam, puta nec rectum, nec circularem, ſed tantum circa medium ſui nonnihil incurvatum. Hic ego jam facilem ad diſtinctam claramqve cordis adipiſcendam cognitionem patere credidi viam, qvandoqvidem his paucis multa dubia, qvæ præſtantiſſimos & noſtri ſeculi & ſuperiorum Anatomicos inter ſe commiſerant, ſponte viderem evaneſcere. Sed cum arrepto ſtylo ſingulorum aggrederer accuratiorem deſcriptionem, cum omnium & in toto corde & in ſingulis fibris partium ſitum ordinemqve ſcrutarer attentius, hic diem excipiens dies, novas oriente luce induxit tenebras, ad qvas diſcutiendas nullum, niſi ab muſculorum cognitione, remedium. Et ſic cordis ſcrutinio accedens muſculorum examen id effecit, ut alia varia lingvam, œſophagum, levatores coſtarum & earundem depreſſores &c. ſpectantia, imo, ob ſectiones in amicorum gratiam inſtituendas, qvædam peregrina plane ultro ſe offerrent. Hac itaqve ratione non modo occurrentibus forte impedimentis avocatus, ſed & aliarum inqviſitionum partim neceſſitate, partim curioſitate detentus, non potui ad finem optatum, qva ſperaveram celeritate, pertingere. Et jam tandem ad umbilicum fere omnia perduxeram, cum ecce caſum inexſpectatum, qvi non a chartis modo & ſectionibus me meis abſtraxit, ſed & omnem ſimul ſpem abſtulit eodem ad aliqvod tempus revertendi. Ne itaqve fidem fallere videar, neu, qvæ hoc fine a me acta, propter alias cauſas geſta credantur, adeoqve ſuſpicionibus parum æqvis innoxius ſubjiciar, hoc velut indice, qvænam illa ſint, qvæ de corde muſculisqve meditor, qvantum mea mihi ſuggerit memoria, indicabo. Qvia vero obſervationum non ita pridem editarum, vel amicos tantum inter ut diſtribuantur, ſufficientia exemplaria deſidero, qvæ mihi de glandulis potiora viſa, novis obſervationibus hinc inde aucta & illuſtrata prædictis ſubjungam.

Ut honore dignos ignominioſe tractat ſæpius, ſaltem tenebris ſuis relinqvit immerſos, ſic non magna meritos ad ſumma rerum faſtigia non raro extollit, qvæ non malorum minus qvam errorum fecunda Mater audit, parum circumſpecta eorum, qvæ conſiderari & poterant & debebant, conſideratio. Illud ſuo nos glandulæ docent exemplo, hujus vivam in corde imaginem notamus. Cor innati calidi ſedem, animæ thronum, qvin ipſam nonnulli animam voluerunt:

cor ſolem, imo Regem ſalutarunt, cum tamen, ubi rem rite examinaveris, non niſi *muſculum* ſis inventurus. Non eqvidem ignoro *Galeni* effatum, qvi *Adminiſtrat. Anatom.* l. 7. §. 8., *Nihil,* ait, *intelligunt, qvi cor muſculum eſſe dicunt.* Nec obſcura magni *Hofmanni* in illos ſanna, qvi a nerveo plexu cordis deducunt motum, dum de thorace l. 1. cap. 8. ait: *Illos ridebo potius, qvam confutabo.* Sed niſi de oratione diducenda, qvam de invenienda veritate, ſolliciti magis hoc in loco fuiſſent nominati modo Celeberrimi Viri, niſi, qvæ ſibi ipſi finxerant, principia illis, qvæ ex Naturæ phænomenis hauriuntur, prætuliſſent, ſuum ſic judicium, ut hic, ita plurimis aliis in locis, minime præcipitaſſent; nec iniqvam adeo cenſuram tuliſſent de illis, qvi, qvam ipſi forte ſibi perſvadere non poterant, ſententiam tuebantur. Sc. veritatem negaſſe parum, a negatione riſus ſi abfuerit & contemptus. Sed rideant licet, dicantqve, eos nihil intelligere, qvi cum Medicorum Principe, *Hippocrate,* cor muſculum pronuntiant, ejusqve motus miniſtros cum recentioribus putant nervos, nervos tamen illius ad motum concurrere, ipſumqve cor revera muſculum eſſe, cum ſenſibus conſpirans ratio manifeſte ſatis evincet: id qvod ob multiplicem experientiam nunqvam ſatis laudati Celeberrimi Viri D. *Harvæus* & D. *Sylvius* jam ante ex parte docuerunt, licet ille diſtinctam fibrarum non habuerit cognitionem, hunc aliæ curæ cœptam telam pertexere non ſiverint. Verum qvo dicta pateant evidentius, brevem eorum præmittam enarrationem, qvæ muſculi hiſtoriam paulo, qvam hactenus factum, clarius, ut ſpero, diſtinctiusqve notam reddent, *tum qvorundam uſum ex fibrarum ſitu reddendo certiorem, tum veram omnibusqve competentem fabricam delineando.*

In thorace non ubiqve Scriptis Anatomicorum reſpondet autopſia, unde non mirum, tantas opinionum tamqve diſcordes ibi occurrere diverſitates. Non hujus loci eſt nec temporis omnes illas recitare controverſias, qvas reſpirationi inſervientes muſculi hactenus aluere: ſuffecerit ad illas tollendas, qvæ Anatome depromit, indicaſſe.

Intercoſtales varii varios voluere, qvidam etiam e muſculorum numero eximendos, non ſane aliam ob cauſam, niſi qvod fibrarum verus in muſculo ductus non ſatis perſpectus. In exterioribus id patet maxime, ubi diverſos omnino muſculos pro uno & eodem habuerunt. Fateor, idem omnes præſtare munus, ſed id non obſtabit, qvo minus pro diſtinctis habeantur, qvi ortu diverſi diverſum tendinis habent ſitum, & angulos cum coſtis conſtituunt diverſos: qva- *Intercoſtales exteriores.*

les qvi a tranſverſis vertebrarum proceſſibus in coſtarum inferiorum ſuperius latus deſcendentes *coſtarum levatores* ſuo jure videntur ſalutandi. Hic, qvi vertebris continuus, tendo exterius conſpicitur diffundi, coſtis vero qvi jungitur, per oppoſitam interiori ſuperficie partem ſe expandit. Initium intercoſtalium hos appellat exercitatiſſimus *Spigelius*, qvi ſolus, qvod ſcio, intercoſtalibus eſſe cum vertebris commercium, notavit. Sed qvis intercoſtalis muſculi dixerit initium, qvod ne intercoſtale qvidem eſt, cum non coſtam, ſed vertebram coſtæ jungat? Præterea in coſtis inferioribus vix intercoſtales, niſi inferioris tendinis extremo velut apice, contingit, cum qvibus angulum ibidem in inferioribus conſtituit tertia qvadrantis parte ampliorem; nec illa exteriorum intercoſtalium negligenda pars, qvæ ſuperioris coſtæ oſſeam extremitatem cum inferioris cartilagine connectit. De carnis vero longitudine tendinisqve inſertione qvæ dici poterant, ex generali muſculorum fabrica patebunt facile attendenti.

Levatores coſtarum.

Sacrolumbi verum uſum non obſervatus fibrarum ductus reddidit obſcurum: de eo multa poſſent afferri, ſed cum in variis omnia necdum examinaverim ſubjectis, nec humani cadaveris mihi data occaſio, ex qvo in illius inciderim examen, qvid in paucis illis, qvæ interea ſecare licuit, viderim, brevibus referam. Oſſi ſacro & ſpinoſis lumborum apophyſibus ejus adſcribunt ortum, cum tamen minima tantum ejus pars ſuam inde ducat originem, reliqva, qvæ maxima, a coſtis oriunda. Non vero ab inferiore coſta in proxime ſuperiorem illico feruntur fibræ, ſed qvædam tres, aliæ plures intermedias tranſcendunt. Nec, qvas una emittit, fibræ uni tantum inſeruntur, ſed qvædam tribus, aliæ qvinqve, nonnullæ ſeptem coſtis proſpiciunt. Pari qvoqve ratione qvilibet conſpicuus tendo non ea, qvam una ſubminiſtrat, contentus carne qvibuſdam in locis a qvinqve coſtis emiſſas colligit fibras. Nec confuſa hæc adeo, qvin in ſubjecto mediæ magnitudinis ſeparari & demonſtrari poſſint facile, tum a tendine retrorſum deſcendendo ſectione recta, ut multiplices ejus conſpiciantur ventres, tum ſectione laterali ſeu tranſverſa a ſpatio inter coſtas intercepto ſurſum pergendo, ut tendinum unius ventris videatur numerus: qvandoqvidem qvilibet integer venter pluribus tendinibus largiatur ſuam ſingulis partem, & integer qvilibet tendo pluribus e ventribus ſuam a ſingulis partem accipiat.

Sacrolumbi.

Triangularis dictus muſculus a coſtarum verarum oſſea extremitate ad mediam ſterni lineam pergit, ſed non eodem fibrarum ductu;

Triangularis.

qvandoqvidem ſuperiores acutum cum ſterno angulum conficiant, illas vero excipientium reliqvarum, qvo fuerint inferiores, eo anguli minus acuti deprehendantur.

Diaphragmatis hiſtoria multis & dubiis ſcatet & falſis. Nec enim centrum verſus omnes confluunt fibræ, nec in centro motus principium, ſed fibrarum extremitas in vertebris altera, altera in ambitu, qva coſtis ſterniqve appendici jungitur, mediam vero membranam tendinum fibræ conſtituunt, inter medias carnes, velut in digaſtrico muſculo, interceptæ, ductuqve non recto, ſed vario, qvam elegantiſſime circumductæ. Radices ejus binas tantum agnoſcunt uni vertebræ inſertas, cum mihi pauciores tribus nunqvam viſæ, ſæpe vero qvadruplices notatæ, ſemper, qvotqvot fuerint, duarum ſe mutuo excipientium vertebrarum ſuperiori ſupercilio circa medium infixæ, unde per mediam earundem aſperam lineam deſcendere tantillum videntur. Nuper in cane, ubi tres diaphragmati erant tendinis hujus partes, vidi minorem ſiniſtram tertiæ dorſi vertebræ inſertam, dextras vero, qvæ & binæ erant & ſingulæ dicta majores, tertiæ qvartæqve continuari. Carnium ductum circuli radiis voluere ſimilem, ſed parum congrue: fac enim illis competere, qvæ coſtarum inhærent circulo; qvarum tendines verſus dorſum confluunt, omnino repugnant. Qvid qvod membranarum qvidem, non autem ubiqve fibrarum interventu reliqvis adhæreat, cum tota radices ejus inter & coſtas intercepta peripheriæ portio, ſi pleuram ſeparaveris & peritonæum, omnino libera ſit conſpicienda. Liceat mihi cum Anatomicorum venia dicere, necdum ullam diaphragmatis mihi in illorum tabulis viſam figuram, qvæ veram ejus teſtetur factam Anatomen; uſqve adeo nec fibrarum vel in carne, vel in tendinoſa membrana ductum, nec tendinum vel in coſtas, vel in vertebras inſertionem, nec deſtinatum ventriculo tranſmittendo hiatum vere delinearunt, ut taceam, qvæ alia, qvo loco in tendinem abit caro, elegantiſſima potuiſſent notari. Sed, niſi Deo aliter viſum, de his aliisqve alibi plura. De principio ejus & fine qvæ non leguntur diſputationes, licet partem parti non adducat diaphragma? Nec enim, cum vel maxime tenditur, in rectam extenſum eſt, nec, circa qvam moveatur, trochleam habet (niſi abdominis hic volueris nominanda contenta), nec qvibus inhæret, ſolam præter cartilaginem enſiformem, ulla pars, dum ipſa movetur, mobilis eſt: vertebras namqve fixas qvis negabit? Coſtas vero rigidas, qvi illas elevant, tenent muſculi. Multa alia

Diaphragma.

ſunt, qvibus reſpirationis hiſtoriam obſcuram reddidit neglectum accuratius muſculorum examen, ſed nihil majorem movet admirationem, qvam qvod coſtis movendis illos addixerint muſculos, qvorum oppoſita ſi qvieſceret extremitas, alii tenderentur muſculi, ut pars, cui inhærent, ratione coſtarum, pro qvieſcente haberetur. Sed his miſſis qvorundam muſculorum deſcribam in reſpiratione uſum, qvorum demonſtrationem Mathematica forte non minus certam non poterit non invenire, qvi, qvos dorſum, coſtæ, ſternum, muſculi inter ſe conficiunt, angulos attente examinare non recuſaverit.

Muſculorum qvorundam in reſpiratione uſus.

Levatores coſtarum cum intercoſtalibus exterioribus 1. & ſurſum & retrorſum coſtas movent, 2. ſpatia intercoſtalia dilatant, 3. intercartilaginea intervalla contractiora reddunt, inferiorisqve coſtæ cartilaginem verſus ſuperioris oſſeam extremitatem adducunt.

Triangularis muſculus verſus coſtarum verarum extremitates oſſeas ſterni humiliores partes ſurſum adducit, cartilaginum ſpatia contrahit, oſſium ſpatiis dilatandis inſervit.

Intercoſtales interiores 1. ſternum qvaſi detrahunt, 2. cartilagines a ſe invicem diducunt, 3. coſtas ſuperiores ad inferiores deducunt, earumqve ſpatia reddunt arctiora.

Sacrolumbus dictus coſtas & deducit, & ad ſe adducit mutuo.

Diaphragmatis non tam ora contractior fit, qvam arctior convexitas: omnes enim, qvas a vertebris ad reliqvum ambitum placet concipere, lineæ, & cum reſolutum langvet, & cum tenſum riget diaphragma, qvadam ſui parte incurvatæ ſunt, convexa thoracem, abdomen concava reſpicientes. Hæ qvo minus tenſæ, eo magis convexæ, eo amplius abdomen, anguſtior thorax; qvo vero contractæ magis, eo minor convexi diaphragmatis ſuperficies, eo thorax amplior, anguſtius abdomen. Et ſic thoracis fundus, in inſpiratione depreſſior, in exſpiratione adſcendit: qvid vero diligentiſſimo alias *Arantio* impoſuerit, qvi ſe in eqva & viſu & tactu obſervaſſe ait, in exſpiratione conſtringi diaphragma, non video.

In cygno primum, hinc & in gallina vidi a coſtis in pulmonum membranam carnoſas ferri fibras, ſine omni dubio in reſpiratione non otioſas.

Sed hæc ὡς ἐν παρόδῳ; ad obſervationes ipſam muſculi fabricam ſpectantes progrediamur.

Fabrica muſculorum.

Cum ab cœpto cordis ſcrutinio deterrere me inciperent, qvibus muſculorum doctrina involvitur dubia, cuniculi, cujus tum forte

ad manus cadaver, pedem arreptum in ſuos reſolvi muſculos viſurus, num ſpes ad certiora perveniendi ſupereſſet. Primus, in qvem forte incidi, reſectus, & ab extremo ad extremum recto ductu diviſus, ſimpliciſſimam omnium, qvos inde videre contigit, exhibuit figuram: tendines enim oppoſiti in extremis collecti, ad carnoſum ventrem ubi pervenerant, diffundebantur ita, ut alter ſuperiorem, inferiorem alter medii ventris per ſuperficiem expanſus ſenſim attenuaretur; has inter expanſiones tendinoſas carnoſæ recto ductu incedebant fibræ, ſuis ſingulæ tendinoſis fibris continuæ. Inde alios aliosqve ad examen vocavi muſculos, qvi primam obſervationem ad unum omnes egregie confirmabant. Licet vero primam in omnibus invenirem figuram, non tamen eodem ubiqve modo: in qvibuſdam omnino ſimplicem, in aliis compoſitam, & id qvoqve varie; vix autem in ullo elegantiorem, qvam in temporali, qvi a maxillæ proceſſu ad cranium uſqve fibrarum ductum ſeqvente cultro diſſectus pulcherrimo oculos ſchemate oblectavit. Tendo enim inferior mediam in carnem adſcendens in laminam qvaſi ſenſim attenuatur, cui carnes eodem utrinqve adſiſtunt modo, qvo pennas avium plumulæ ornant: qvæ ab interiore tendinis latere oritur, caro proxime continuatur cranio, oppoſita pars expanſum habet ſupra ſe tendinem, qvo interveniente itidem cranio inſeritur. Miror, non ad ulterius examen ſcitiſſimo fibrarum ductu abreptos, qvi e medio temporalis prodire viderunt tendinem. Sunt & alii hinc inde qværendi muſculi, qvos idem fabricæ commendat artificium.

Simplicium.

Compoſitorum, ut temporalis.

Inde ad *lingvam* perrexi, ubi muſculorum extrema in peculiarem abire ſubſtantiam voluerunt. Sed facto examine vidi, peculiarem hanc ſubſtantiam muſculoſam eſſe, qvod ut alii ſic & *Nicolaus Maſſa* in ſuo *Libro Anatomiæ Introductorio* a variis lingvæ motibus demonſtravit, licet fateri coactus, carnem hanc *non eſſe diſtingvibilem, ſed tantum per operationes cognoſcendam.* Sed ἀδύνατον illico non pronuntiandum, qvod nobis ἀδύνατον forte viſum. Ab apice namqve ad ipſam uſqve baſin diſtincte omnes fibrarum ſeries demonſtrare licet attendenti, qvæ in toto lingvæ corpore tantum triplices. Exteriores ſuperioriqve ſuperficiei proximæ fibræ rectum ſecundum lingvæ longitudinem ſervant ductum, reliqvarum totum medium corpus occupantium duo tantum genera, unum, qvod a ſuperiori lingvæ plano deſcendit, alterum, qvod a medio verſus latera in homine recedit. In certas hæc duo genera ſeries diſpoſita ſunt, ſe

Lingvæ ſubſtantia.

alternatim excipientes, qvarum ſingulæ vix niſi unam in craſſitie continent fibram, ita ut ſtratum ſuper ſtratum hic non inepte applicarent Chymici. Ipſum ſuperius lingvæ planum tunicam exteriorem inter & carnes carnium tendines ſervat clauſos. Sed hæc innuiſſe ſuffecerit; nec enim patitur locus ad opiniones guſtum ſpectantes lingvæqve varium in variarum litterarum pronuntiatione motum explicandas evagari.

Œſophagi carnoſa dicta tunica.

Œſophagus in qvibuſdam, qvibus contexitur, fibras multas licet poſſideat, ſpirales omnes ad duo tamen genera commode illas reduxeris, duas nempe cochleas, qvæ, ubi contrario ductu ſibi occurrunt, ita ſe interſecant, ut qvæ ſub altera eo uſqve inceſſerat, mox alteram ſcandens ſupra illam, donec ſibi iterum occurrant fibræ, progrediatur. An aliis etiam piſcibus datus, qvo raja ſuperius ventriculi ſui orificium conſtringit, muſculus, nondum experimento didici. Elegans ille omnino unius tantum generis ſpirali linea multis vicibus dictum orificium ambit.

Ventriculi in raja ſuperior ſphincter.

Longum foret ſingulos recitare muſculos, omnesqve ibi occurrentes evolvere differentias; certas tantum proponam concluſiones ex obſervatis deductas.

Partes muſculum componentes.

I. In omni muſculo reperiuntur arteriæ, venæ, nervi, fibræ, membranæ; addunt qvidam lymphatica, qvæ licet circa muſculos viderim ſæpius, in muſculis necdum mihi viſa ingenue profiteor.

Fibrarum extrema.

II. Nullus occurrit muſculus, cujus ſingulæ fibræ non abeunt utrinqve in tendinem; ſive tendines hi omnes vel utrinqve, vel ab altera tantum parte in firmos colligantur tendines, ſive in membranam diffundantur, ſive in oſſeam degenerent rigiditatem, qvod non fini magis competit qvam principio.

Medium.

III. Caro non eſt parenchyma vel tomentum, ſed eædem fibrillæ, qvæ arcte ſibi connexæ tendinem componunt, laxius junctæ carnem conſtituunt. Et hoc ſenſu vere dictum, tendinem eſſe corpus continuum a principio muſculorum ad finem.

Ductus & anguli.

IV. Nulla in ullo muſculo facile reperiunda fibra, unam rectam qvæ conſtituat lineam, ſed ſingulæ in tres minimum lineas, qvæ duos angulos alternos comprehendunt, diviſæ. Nec ipſæ hæ tres lineæ ſemper rectæ, ſed ſæpe caro (ut ſaltem in ſphincteribus, qvos muſculorum nemo facile exemerit numero) interdum & tendo (ut cum incurvata manu adducuntur digiti) curvam efficiunt lineam.

Qvantitas.

V. Nominatæ tres ſingularum in eodem muſculo fibrarum lineæ

non eandem ſervant longitudinem, licet totæ fibræ inter ſe collatæ vix ullum extenſionis agnoſcant in pleriſqve muſculis diſcrimen.

Sed ut hæc fiant intellectui clariora, præmittenda partium ſpecialior denominatio. Binas muſculus qvilibet rectus & ſimplex, qvi aliorum norma, ſectiones juxta fibrarum ductum admittit, rectam alteram, alteram tranſverſam, non qvidem plano per medium tranſverſim omnia ſecante, ſed ita a latere ad latus acto, ut tendines cum carne maneant integri, ut itaqve diſtincta diſtinctis ſint nomina, liceat ſeries fibrarum rectas ordines, tranſverſas autem verſus vocare.

Ejuſdem ordinis fibræ in eodem plano ſunt, & parallelogrammum obliqvangulum, ſeu rhomboideam exhibent figuram, cujus duo oppoſita parallela, qvo loco cum reliqvis parallelis acutos comprehendunt angulos, angulos extra oppoſitas in partes porriguntur. Et hæc extra figuram pergentia parallela oppoſitos tendines referunt in diverſa abeuntes, reliqva his intercepta, totamqve figuræ aream replentia, parallela carnium ſitum repræſentant. Rem Phyſicam proponenti venia detur, ſi Mathematicis nominibus Phyſicas, non Mathematicas, deſignem lineas. Adeo enim omnis latitudinis non ſunt expertes hæ lineæ, qvin carnes ſingulæ totidem parallelogramma, tendinum duæ oppoſitæ collectiones duo trapezia referant. Sed illam Mathematicis relinqvamus ἀκρίβειαν. Hic notandum primo in utroqve tendine, ut ut tenui, totidem eſſe filamenta ſibi mutuo incumbentia, qvot in ventre numerantur carnes, unde patet, qvanto compactiores carnibus tendines. 2. Interiora filamenta tendinum exterioribus ſemper breviora: hinc in eodem ordine fibræ licet & totæ, & qva carneæ ſunt, inter ſe ſint æqvales, tendinoſarum utrinqve partium certam ſervant inæqvalitatem, qvam ſyringæ veterum aſſimilaveris non inepte: & ſic qvemlibet ordinem accuratius ſi inſpexeris, tres invenies figuras, duas ſibi inverſo modo oppoſitas ſyringas, & medium parallelogrammum.

Fibrarum verſus ut plurimum in tres figuras reſolvitur non eidem plano incumbentes, unam carnium, qvæ rectangula, tendinum duas, qvæ vel rectangulæ, vel triangulæ, vel trapeziæ pro varia tendinis integri figura, hinc facile ſingularum in verſibus fibrarum determinanda qvantitas. Ex verſibus ſibi mutuo ita impoſitis, ut media illorum plana qvoddam qvaſi parallelepipedum componant, muſculus exſurgit, ubi verſuum compages ex fibrarum in ordinibus ſerie innoteſcit; cum tot in muſculo ſint verſus, qvot in qvolibet

ordine fibræ, & in verſibus extimis tendinum oppoſitorum ejuſdem verſus maxima notetur in extenſione diverſitas, in reliqvis, qvo ab extremo verſus medium receſſerint propius, eo magis magisqve ſenſim decreſcat oppoſitorum tendinum inæqvalitas.

Muſculi diviſio in extrema & medium.

VI. Vere & commode qvilibet muſculus dividitur in ventrem & tendines, ſ. medium & extrema; de fine vero & principio deqve ligamento controverſiæ nunqvam, niſi certum poſueris fundamentum, determinandæ. Si liceret mihi hic libere fari, non ego carnes reſpicerem, non tendines, nec de nervi inſertione ſolicitus eſſem, ſed extremum qvieſcens principium, mobile finem dicerem: cum vero vices interdum mutent extrema, & qvod jam mobile, alio corporis ſitu, qvieſcens evadat, abſtinerem potius iſtis nominibus, & in extremorum appellatione acqvieſcerem, cum, proprie loqvendo, neutrum vel principii vel finis mereatur nomen. Nec enim eo modo generatur muſculus, ac ſi ab una parte ſenſim progrederetur verſus alteram, cum ſangvinis id non patiatur motus; nec omnibus ſemper muſculis eadem extremitas qvieſcens; & ſi pro principio illud habendum, verſus qvod reliqvi fit motus, in omnibus muſculis pro principio habendus venter, qvandoqvidem, pro ſitu vario, utriuſqve extremi ventrem verſus fiat motus, & in ventrem vaſorum fiat inſertio: adeoqve ſi partium ſucceſſiva admittenda generatio, inde petenda origo, ubi vaſorum inſertio deprehenditur. Sunt hujus generis alia, qvibus multum temporis impenditur & chartæ, & tandem, ubi examinata omnia, probabili ornando diſcurſui ſerviunt, rei veritati nullum omnino præſtant uſum. Ut itaqve in certis ſubſiſtamus, retineamus muſculi diviſionem in ventrem, ſeu mediarum carnium corpus, & tendines, ſeu extrema. Nec enim exiſtimandum carere extremorum altero muſculum, cujus carnes oſſibus, ſine interveniente tendine, inhærent, ut in parte muſculi temporalis, in variis artuum muſculis. Nonne in prima partium generatione, qvæ modo oſſa, membranæ fuere? At in oſſa tendines abire, in avium genere freqvens; ubi ſane non aliter medio tendinum oſſi continuantur carnes, qvam muſculi temporalis carnes cranio inſeruntur.

Tendines.

Duo itaqve in qvolibet muſculo tendines ex tendinoſarum fibrarum verſibus compoſiti, cum ex oppoſitis partibus prodeant, per ventris oppoſitas hedras expanſi ſenſim tenuiores evadunt. Suntqve vel ſimplices, qvorum expanſiones exterius conſpiciuntur; vel compoſiti, ubi in uno extremo per medias carnes ingreditur, in altero

medias utrinqve amplectitur carnes, & hic muſculus videtur ex duobus qvaſi muſculis compoſitus.

Ventris longitudo carnoſarum fibrarum non ſemper menſura, cum longiſſimus ſæpe venter breviſſimas obtineat carnes. *Venter.*

VII. Membrana non modo tranſverſo fibrarum ductu muſculum ambit, ſed & eodem ſe modo inter ſingulas ejus inſinuat fibras. *Membrana.*

VIII. Muſculi qvidem actio eſt contractio, ſed eam qvadam velut neceſſitate minime ſeqvitur, ut inter duo extrema muſculi puncta intercepta recta evadat brevior, ſed ut breviores ſemper fiant inter eadem duo puncta interceptæ ſingulæ ejuſdem muſculi fibræ. *Muſculi actio.*

Qvi contrahitur, non tendo eſt, ſed tendinoſas inter expanſiones comprehenſa caro, qvæ in ſe contracta id efficit, ut oppoſita duo vel plura ventris plana ad ſe mutuo propius accedant, non itaqve primum motus inſtrumentum tendo, nec muſculi vel principio motum debemus, vel fini.

Contractionis modus determinatu difficilis, cum a repletione fibrarum multi eam deducant, ab inanitione nonnulli, qvidam vero ad utramqve confugiant. Temerarius eſſem, ſi hic meum interponerem arbitrium: qvare de cauſis modisqve *non liqvere* aperte pronuntio, & cum per ſimilia explicatio multis magnopere arrideat, dabo, qvod hic non erit omnino ἀπροσδιόνυσον. Qva palos ſublicasqve in terram in ſubſtructionibus pangunt, machina, ubi plurimi homines ſuam ſinguli trahentes chordam funis ductarii interventu fiſtucam elevant, muſculum per mediam carnem tranſverſim diſſectum non inconvenienter refert: chordæ namqve tendines imitantur, pro hominum diſtantia ſenſim longiores, affixum chordis pondus partem mobilem, ipſi homines carnoſas fibras: ut enim homines breviores redditi, ſuas dum ſimul trahunt chordas, pondus movent; ſic carneæ contractæ fibræ, dum tendinis trahunt fibras, mobilem movent partem. Sed cum ſimile hoc tantum ſit, non diutius ipſi immorandum.

Qvo brevior in longiore ventre caro, eo vis contrahendi fortior, cum fibrarum major ſit numerus.

IX. Qvæcunqve pars nec muſculo neceſſariam ullam deſiderat partem, nec aliam muſculo denegatam poſſidet, & fabricam ſimul muſculo convenientem obtinuit, non poterit non muſculi mereri nomen. Nec reqviritur, ut actu voluntatis ſubjecta ſit imperio; multi enim in multis muſculi nunqvam ad animæ moventur arbitrium, qvod in variis laryngis linqvæqve muſculis, ut & dorſi ſingulo-

rumqve artuum probatur. Et qvid, qvæſo, in animali motu agit anima? Nonne viſum ab alio motum variis flexibus tam diu imitatur, ipſum donec verum forte invenerit? Sed manifeſtiora hæc, qvam qvæ pluribus diducenda, cum nemo non in ſe ejus rei evidentiſſima deprehendere valeat, qvot velit, argumenta.

Qvid prædicta muſculorum fabrica ad morborum qvorundam curationumqve rationes facilius explicandas accedente ulteriori examine conferre poterit, ex ſeqventibus, velut ex ungve, dignoſcere licet.

Dixi, carnem tendinoſas inter expanſiones contineri, jam vero in gallo Africano non ita pridem vidi in variis pedum muſculis totam tendinoſam expanſionem a ſubjecta carne ita liberam, ut non niſi tenuiſſimis qvibuſdam fibrillis illi adhæreret, qvæ accedente vel leviſſima vi rumpebantur illico, & ſic membranæ inſtar conſpiciebatur tendo. Ipſæ vero extremitates carnoſæ, qvæ huic ante continuæ fuerant tendini, a reliqva carne, qva albicantiores qvidem, ſed & firmiores, ſecedebant facile, ſimulqve humiditatem qvandam ſibi habebant circumfuſam. Hæc qvidem ſemel tantum in gallo obſervavi; qvid vero impedit, qvo minus idem humanis qvoqve muſculis interdum eveniat, adeoqve motus in certa parte debilitati, vel in totum in eadem ablati, hæc interdum poſſit eſſe cauſa, prout vel omnis, vel ſui qvadam parte a carne ſeceſſerit tendo? Creditum hactenus, ab uno extremo ad alterum recta in muſculo extendi fibras; unde ſeqveretur, a ſectione tranſverſa qvacunqve lædi motum, minime vero a recta. Evidens qvidem illud, ſi medius tranſverſim divideretur muſculus, omnes diſſecari fibras; ſed & illud clarum muſculi reddit fabrica, poſſe vulnus per medium tranſverſim muſculum lato agi ferro, motu non violato, modo intra eadem parallela maneat ferrum, nec oppoſitas expanſiones lædat. Ex adverſo rectæ illæ ſectiones omnes, qvales infinitæ, qvæ non eoſdem duos fibrarum intra ordines ſe continent, cum fibris motum plus minusve lædunt, prout varie dirigatur culter.

Qvæ hic de muſculis propoſita, ſi cordi applicentur, ſufficiunt propoſitæ initio demonſtrandæ propoſitioni, *Cor vere muſculum eſſe.* Deducam hoc alias fuſius, hic tantum præcipua paucis recitabo.

Partes cor conſtituentes.

I. In univerſa cordis ſubſtantia nihil occurrit ſeqventia præter: *arterias, venas, nervos, fibras, membranas.* Sed nec in muſculo, præter dicta, occurrunt alia. Taceo pingvedinem, oſſa; qvia nec omnia his

inſtructa corda, nec nullus iiſdem præditus muſculus. Qvicqvid vero de parenchymate profertur a fibris diſtincto, Anatomicorum non ſenſibus debetur, ſed ingenio. Vidi qvibuſdam in ſubjectis ſplendentes per ſuperficiem cordis decurrere ductus, qvos tamen non lymphaticos, ſed veros eſſe nervos diſſectio docuit. Plexus nervorum a *Falloppio* deſcriptus autopſiam ſibi habet faventem non minus ac eorundem, ut per ſuperficiem diſperſio, ita ad interiora penetratio.

Fibrarum partes.

II. Inter cordis fibras nulla ſcrutanti mihi obvenit, qvæ non medio carnoſa, extremis utrinqve tendinoſa, id qvod & omnibus muſculorum fibris commune.

Ductus & anguli.

In corde non minus, ac in alio muſculo, villorum uniformis eſt ductus; omnes enim circa mediam fere carnem arcus inſtar inflexi nullos, niſi cum tendine utrinqve, conficiunt angulos. Rectos, tranſverſos, circulares villos finxere, qvi Naturæ fines æqve ſibi credidere notos, ac ſi illi fuiſſent a ſecretis. Videntur qvidem intricati, ſed nec confuſi ſunt, nec inextricabiles; qvandoqvidem una eademqve intorſionis ſit ratio omnium in ſiniſtro ventriculo occurrentium, id qvod coni in ſtellarem figuram reſolutio clare demonſtrat. Nec in dextro ventriculo caute progredientem Labyrinthei morabuntur flexus. Figuris ea, qvam verbis, intelligerentur commodius; paucis tamen eorum qvandam velut ideam dabo.

Exterior cordis a membrana fibrisqve liberati facies primo adſpectu ſvadere videretur, eundem omnium undiqve fibrarum, obliqvum puta, a baſi ad conum eſſe ductum; ſed ipſas inde carnes a ſe mutuo ſeparantibus patet, dictarum pauciſſimas ad conum pertingere; cum a baſi, tantillum ſub ſeqventibus ubi deſcenderint primæ (liceat primas hoc loco vocare, qvæ anterius in ſiniſtri ventriculi orificio conſpiciuntur in ipſo cum dextro concurſu), illico intortæ ſub reliqvis ſiniſtrorſum ferantur: ſic ſeqvens ſemper fibra præcedente tantillo longius deſcendit, anteqvam incurvetur; incurvata vero ſeqventem ſubit itidem, non niſi infra prioris intorſionem inflectendam. Et hæc fere omnibus fibris competens incedendi ratio, qvæ vix explicabitur commodius, qvam ſi mente concepto aut manibus formato ex fibris parallelum inter ſe ſitum ſervantibus parallelogrammo, ſic ſatis oblongo, ex breviſſimis lateribus, qvæ filorum extrema habent ſibi annexa, alterum ſemel inverteris integrum abſolvendo circulum; ſimilem hic namqve filorum & intorqventium ſe, & ſe mutuo ſcandentium videbis imaginem. Qvod ſi

vero etiam plura id generis parallelogramma finxeris, fecerisqve ad parallelepipedum aliqvod componendum concurrentia, hedrarumqve, cui innexa fila, alteri, qvem dixi, ſitum dederis, & inſuper eaſdem breviores hedras, ſibi ante oppoſitas, reddideris in eodem plano ita ſitas, ut medius filorum laxior ductus arcum repræſentet, non amplius confuſam fibrarum in corde accuſabis ſeriem. Sed figuris hic opus ad ſingula clarius demonſtranda, qvas in alia tempora differre coacto non conveniet hic multis exponere: qvomodo in parietibus ventriculorum fibrarum variet ductus; qva ratione ex fibrarum exteriorum diverſis e locis prodeuntium concurſu interiores exſurgant monticuli; qvam elegantem exhibeat figuram coni varia reſolutio; qvi oculis exhibendus, ubi carnibus continuantur tendines, carnium in oppoſitas partes a ſe mutuo digreſſus; & plura alia, qvæ manum attente & patienter admoventi ſponte ſe ſiſtent, alioqvin in ipſa cordis hiſtoria integre proferenda.

Venter. Ventrem hæc muſculi noſtri & cordis ſimul ventres conſtituit fibrarum media, ſeu carnoſa, portio, cujus ſubſtantia, licet omnium & oculis & manibus obvia, tot peperit rixas, qvot vix ulla pars alia. Dividunt hanc in baſin & conum, qvem hactenus credidere denſiſſimum, licet medium ejus punctum, ſeu relictum in medio intortarum fibrarum centrum, adeo tenue ſit, ut aciculæ vix æqvet caput, cum non niſi exterioris ibi membranæ cum interiore fiat concurſus.

Tendines. Extrema carnium excipientes tendines in oſtiis partim, partim in monticulis conſpiciuntur, ubi & valvulas conponunt, & in arteriæ ſubſtantiam abeunt. (Venis enim, utpote qvæ auricularum alteri tendini continuæ, nullum niſi mediantibus auriculis cum corde commercium.) Hic muſculi & principium qværendum & finis; hunc arteriæ pulmonalis orificium & utriuſqve ventriculi valvulæ tricuſpides, cum aortæ qvadam parte, ea nempe, qvæ valvulam mitralem conſtituit, repræſentant, illud, qvi arteriæ magnæ reliqvam baſeos portionem largiuntur, tendines.

Non hic exponam, qvo loco vel ſuper, vel inter carnes ſe expandat tendo, nec carneam in dextro avium ventriculo delineabo valvulam, nec, qvam in variis animalibus obſervavi, variarum partium diverſitatem recenſebo, cum nullius mihi adſit figura, non omnium incidat memoria.

Os. Officulum in corde repertum non in grandibus modo animalibus, ſed in ovibus etiam ſæpiſſime mihi viſum, nec omnibus ineſt ani-

malibus, nec, qvibus eſt, qvicqvam eſt, niſi tendinis pars in oſſeam duritiem degenerans. Sic non in pennatorum modo pedibus medio in tendine oſſea notatur ſoliditas, ſed & in qvolibet animali multorum muſculorum alter tendo, vel totus, vel ſui parte, in os abit, qvod, ut in cranio, ſic & in manibus pedibusqve demonſtratu facile. Qvæ itaqve ratio extracto e cervi corde oſſiculo alias attribuendi vires, qvam alteri ejuſdem animalis (non enim dubito, qvin in diverſis animalibus etiam oſſium diverſa nonnihil ſit natura) oſſi, cujus partem muſculi faciunt tendines?

III. Membrana cordi propria tranſverſo fibrarum ductu cordis ſecat fibras, eodemqve inter illas ſe inſinuat ritu, nec aliud in muſculi occurrit membrana. *Membrana.*

Cum itaqve vera muſculi attributa cordi competant omnia, nec illa præter aliud inveniatur, vere *cor muſculi nomine ſalutandum, qvod meretur & tendine, & carne, & nervo.*

Qvæ licet magno *Hippocrati* videantur directe repugnantia, qvi dicit: καρδία μῦς κάρτα ἰσχυρὸς οὐ νεύρῳ ἀλλὰ πιλήματι σαρκὸς, ipſa tamen verba ordine inter ſe comparanti cum noſtris apparebunt amice conſentientia; dicit enim, muſculum eſſe, cujus robur non in tendine, ſed in carne. Atqve ſic qvæcunqve demum fuerit Authoris ſententia, verba ejus minime nobis ſunt adverſa.

Niſi crederem, qvemlibet per ſe facile inventurum, qvæ dubia hæc unica ſolvit propoſitio, nihil facilius eſſet, qvam longum eorum hic attexere catalogum, qvorum nonnulla non Veteres tantum, ſed ipſum etiam *Harvæum* aliosqve Recentiores multos, tenuere hactenus ſuſpenſos: ex præcipuis tamen qvædam proxime ex illa propoſitione ſeqventia adjungam.

Si certum eſt, qvod certum eſſe ſenſuum ope adjuta evincit ratio, in corde nihil deſiderari, qvod muſculo datum, nec qvod muſculo denegatum, in corde inveniri: *non erit cor amplius ſui generis ſubſtantia, adeoqve nec certæ ſubſtantiæ, ut ignis, calidi innati, animæ ſedes, nec certi humoris, ut ſangvinis, generator, nec ſpirituum qvorundam, vitalium puta, productor.* *Qvid ſubſtantia cordis non ſit.*

Qvod ſi enim in omnibus continentibus cum muſculis cordi convenit, etiam in ſubſtantia cordis vaſisqve contenta omnia cum contentis in muſculo ejuſdem erunt naturæ, nam idem utriqve eadem per vaſa ſubminiſtratum eadem recipitur ſubſtantia: cui ultimam veluti manum imponit, qvod eadem utrobiqve actio, puta carnis contractio,

conſpiciatur, cujus cauſa proxima, num a cauſa proxima contractionis muſculorum, in tanta organorum omnium ſimilitudine, tamqve amico conſenſu, diverſa eſſe poterit, videant ſubtiliores.

Sed cordis hæc tantum ſubſtantiam ſpectant, non cavitates, ubi, num qvid ſangvine in vaſis contento nobilius inveniendum, cordis diſputent patroni. Certe, ſi qvid ego video, vereor, ne omnia de partium dignitate argumenta oratoria futura. Sed ut ut ſit, ſolam ego ſumpſi examinandam ſubſtantiam, & ex fibrarum ductu omnia de cordis motu occurrentia phænomena ſuis rationibus demonſtranda; qvod licet maximam partem abſolverim, in aliud tamen differre tempus cogor, cum, ut initio monui, a chartis abſtractus & ſectionibus ad aliqvod tempus eaſdem repetendi otium vix inventurus ſim, & ſimul hæc ſic præmiſiſſe placeat, ut, ſi qvid in iis emendandum veritati faventium invenerit induſtria, monueritqve humanitas, in ipſo dein opere corrigatur, & longiore meditatione & exercitio deſiderata ſuppleantur.

De cordis motu. Ne tamen de motu nihil omnino dixiſſe videar, ſubjungam & hanc propoſitionem. Cum fibræ cordis breviores fiunt, qvia baſin circa & principium earum & finis, *conus neceſſario attollitur;* qvia a baſi ſiniſtrorſum ad conum deſcendunt fibræ, *contrario conus modo adſcendit;* qvia in dextro interius a ſepto deſcendentes obliqve poſteriora verſus per exteriorem ſuperficiem adſcendunt, *fundum dextri baſin verſus tantillum elevant, adeoqve & brevior fit cor, & in dextro latere rotundius;* qvia vero & breviores fiunt parietes & craſſiores, *anguſtiores etiam evadent ventriculorum cavitates. Non itaqve rotundum cor oblongo capacius, adeoqve nec a ſangvine magis dilatato rotunditas, nec eo tempore diaſtole.*

Qvid in orificiis cordis, qva ſpatium, qva valvulas obſervandum, ſtamina qvomodo moveantur, qvalis auricularum muſculus, qvot modis viderim ceſſantem cordis motum ipſi reſtitutum, & qvidem interdum multis a morte horis, idqve repetitis vicibus, & qvæ huc ſpectant alia, cum ſingulorum mihi non ſuccurrat, omnia integro operi reſervabo adjicienda: qvocirca miſſis muſculis ad glandulas pergo.

GLANDULÆ. Glandularum qvouſqve ignota natura, vilis fuit æſtimatio, ritu a communibus viventium moribus non alieno; ubi multi ſæpe in obſcuro latitant, non extra limina noti, non qvod non meliore digni fortuna, ſed qvod eorum ignotus valor. Multum itaqve huic ſeculo

debent glandulæ, qvod, ut in earum indaganda natura diligens fuit, ita in honore reſtituendo felix.

Conglobatæ.

Rotundas ſive conglobatas omnes ſordidarum (qvod de omnibus glandulis Antiqvorum fuit judicium) numero puriſſimæ Bartholinianæ exemerunt Nymphæ, qvæ ſua illas lympha a præteritorum ſeculorum eluvie mundas reddiderunt.

Coglomeratæ.

Reſtitutionis ſuæ primordia *Wirtzungio* debent conglomeratæ: ſed ut primus Author ſua pancreatis gloriam morte expiavit, ſic, illum inde qvi ſeqvuti, parum fuere felices; *Whartoni* namqve induſtriam ſua defraudare laude voluit *Deuſingius,* & ſalivaris exterioris inventionem inventori ignominioſam reddere conatus *Blaſius.* Sed meliori, ut ſpero, fortuna, qvæ priora tria exceperunt, vaſa reliqva gaudebunt.

Utrumqve circa genus, qvæ noſtra mihi Diva, Anatome, revelaverit, ex parte in *Obſervationibus,* ante biennium editis, dixi, reliqva in iis, qvas necdum abſolvi, exponam; hic præcipuorum brevem tantum facturus recenſionem. Spectant autem ea vel prioribus non deſcripta vaſa, vel vaſorum ante obſervatorum illuſtrationem, tum glandularum utriuſqve generis meliorem cognitionem.

Nova, ſaltem mihi, vaſa ſunt

Vas ſalivare exterius, ſive parotidum vas.

I. *Salivare exterius,* cujus radices parotis conglomerata, oſtium in homine buccæ interioris fere centrum exhibet, medius ductus in variis animalibus varius, in homine, cane, lepore, cuniculo rectam æmulatur, in ovibus incurvatur, maxillæ tamen tota, qvam perficit, via incumbens, in boum vero genere ad maxillæ inferiorem angulum deſcendit, inde, ubi ad ſinum eidem maxillæ inſculptum perrexerit, buccas verſus adſcendens. Ductus hujus a Blaſiano, vix extra Authorem, niſi forte in Lunæ incolis, aut *Epicuri* intermundia perreptantibus inveniendo, diverſitas, in qvibus conſiſtit, *Apologiæ Prodromus* anno abhinc editus clare ſatis detexit. Qvocirca cum illa, ut ſpero, abunde manifeſta res, & amicis ſub certa conditione promiſerim, me ad ulteriora non progreſſurum, de teſtimoniis ejus (qvod unicum illius argumentum) hic tantum monebo: longo ea tempore poſt rem geſtam ſcripta, & qvidem a diſcipulis ejus, qvorum qvi ſolus fidem merebatur, præſentibus duobus Profeſſoribus Clariſſimis, agnovit, ſe in aſſignando tempore erraſſe, ſeqve novi ductus factam mentionem ſcire, ille vero ſuperiorne fuerit, an inferior, & utrum alterius, præter eum, ſalivaris ductus facta vel mentio vel demonſtratio, an non, certo ſibi in memoriam non poſſe revocare. Hæc

& alia, qvæ aliis moverent bilem, plurima æqvo animo tuli, licet ea mihi fuerit ſitqve cauſæ juſtitia, ut qvovis tempore in judicium vocare poſſim & ipſum, & *Hobokium*, & Anagrammaſticam Hobokianum. Sed mea mihi ſufficit conſcientia & honeſtiorum, qvos inter vixi ſemper, de me opinio; eoqve me geram modo, ut ſi placuerit illis una cum *Deuſingio* mihi inſultare diutius, in proprio illos foro poſſim redarguere. Theſes ille meas injurioſos appellavit libellos, &, ut cætera taceam, impotentis animi indicia, ætatem mihi meam exprobrare non erubuit. Sed audiat a juvene ſenex, qvod ſuo ipſe exemplo juvenem docuit: nihil honeſtum dedecere magis qvam ignominioſa ſine veris adjunctis rationibus verba in qvenqvam projicere, ejus ad inſtar, cui vel vinum, vel atra bilis, vel cani, qvod de mentis recto uſu detraxere, lingvæ volubilitati addiderunt.

Vaſa buccarum.

II. *Buccarum vaſcula* numero parvitatem compenſantia; qvorum glandulæ ut in homine egregie labiorum ſtipantes ambitum totidem uvas referunt, vaſorum ad illas nervorumqve diſtributione figuræ gratiam augente; ſic in brutis totum buccarum replent planum. In hiſce, brutis ſcilicet, qvædam in unum congeſtæ corpus, & inferiori maxillæ ſecundum longitudinem incumbentes, mediæ magnitudinis vaſa emittunt, qvorum oſtia, in eadem recta ſita, vix niſi expreſſo humore ſe produnt, etiamſi ſemel detecta ſetarum non uſqve adeo ſubtilium ſint capacia; ea illis in locis ſuperficiei eſt æqvalitas & planities. In ovibus tamen qvibuſdam fuſcus interdum oſtia prodit color: aliæ magis a ſe mutuo diſperſæ partim buccarum tunicæ accumbunt planæ, partim in aſperas & acuminatas illam elevant papillas.

Vaſa ſublingvalia minora.

III. *Qvæ dentium intra ſeptum ad lingvæ conſpiciuntur latera, ſublingvalia dicta*, & a Whartonianis diverſa. In avium qvarundam lingvis rara horum occurrit elegantia, ubi in ipſis lingvæ lateribus prope baſin ſecundum eandem rectam diſpoſita decem duodecimve oſtia, ſi comprimatur lingva, ſeroſi humoris totidem protrudunt gemmas. In cygno eadem ſtylum admittebant facile, & pro lingvæ magnitudine ſatis profunde, qvemadmodum & in anate; fuere forte etiam in illis prædictis plura vaſa, ſed horum pulcherrimo adſpectu abreptus ad alia non attendi. In gallo Africano vidi non modo hanc oſtiorum rectam ſeriem, ſed etiam totam tunicam, tum baſin lingvæ inter & oſtium laryngis, tum in ipſis lingvæ lateribus, tum ſub lingvam & glandularum abſcondere corpora, & vaſorum oſtium pertuſam: reliqvorum animalium lingvæ accumbunt tantum laxe &

glandulæ, & vaſa, ne qvidem in boum genere ſetam facile recipientia, licet vaſorum parallelo a glandulis ad oſtia ductu incedentium elegantiam contenti exornet ſplendor, & ipſa expreſſus liqvor detegat oſtia.

IV. *Qvæ palati ſuperioris tota tunica innumeris pertuſa foraminibus a glandularum glomeraminibus orta recipit vaſa;* qvæ qvo retrorſum magis perrexeris, eo magis conſpicua. Si avium roſtra diſtraxeris, & ibi liqvoris in palato ſuperiori notabis fontes. Omne enim illud, qvod albam tunicam roſtro proximam excipit, *rimamqve cingit undiqve,* carneo colore conſpicuum, ſi preſſeris, glandularum oſtia prodet: præ cæteris notanda in ipſo hujus ſubſtantiæ anteriori extremo duo puncta, per qvæ magna humoris albicantis exprimitur copia, qvæqve vel in gallina domeſtica ſtylum admittunt non tantum in ſuperficie. *Vaſa palati.*

V. *E naribus in palatum anteriori loco dentes intra, qvibus dentes ſunt, proxime deſcendens meatus;* qvem fretum ſi dicere placuerit, non erit e longinqvo petitum ſimile. In brutis hic qvam homine ut amplior ita & manifeſtior. In diverſis varius apparet, qvod vituli, ovis, canis, cuniculi diducta inter ſe conferentibus ora, dignoſcere integrum. Ejuſdem in avibus vice fungitur poſterius palatum dividens rima. *Meatus anterior e naribus in palatum.*

VI. *Epiglottidis cartilaginem permeantes canaliculi;* qvi, a carunculis epiglottidi incumbentibus orti, per cartilaginem tranſmiſſum humorem averſa ejus parte, qvæ laryngi imminet, evacuant. *Vaſa epiglottidis.*

Non his annumerabo, qvæ in variarum avium œſophago & ingluvie conſpecta mihi vaſa, cum ex illo perceperim, Clariſſimo cuidam Viro, Anatomes qvondam cultori dexterrimo, in gallina id generis ante qvædam obſervata. In cygno œſophagi tunica innumeris perſperſa punctulis totidem inde manantis aqvei humoris protrudebat guttas, ingluvies vero craſſior & aſpera non multo pauciores albi & viſcidi ſucci indicabat fontes. Sed his miſſis ad nares tanqvam ſecundam contignationem adſcendam.

VII. *Qvæ narium tunicam irrigant vaſcula;* cujus humorem non ab oſtiis arteriarum (natura has pro arbitrio jam claudente jam reſerante) emitti, tunicæ ab oſſe ſeparatæ & ab inverſo latere inſpectæ docet examen. *Vas narium.*

VIII. *Vas illud narium, qvod non niſi in ovibus mihi hactenus notatum;* cujus radices in poſteriori narium parte ortæ in ramum ſtyli capacem confluunt per narium latera verſus anteriora progredientem. *Vas narium ovibus peculiare.*

Viæ a palpebris in nares.

IX. *Colliciæ, ſ. punctorum lacrymalium in unum utroqve in latere ductum concurſus, humorem palpebrarum in narium cava derivantes.* Non exigua hic in diverſis animalibus differentia. In homine ipſis ciliorum apicibus inſculpta foramina breves demittunt canaliculos, nec demonſtratu faciles, niſi caute diffractis narium oſſibus tunicæ relinqvantur integræ, mox enim, ubi oſſa penetraverint (qvo uſqve tenui ſeparantur membrana), in ſinum ampliati narium continuantur tunicæ. In ove, lepore, vitulo, cuniculo non in ipſis ciliis, ſed interius paulo eadem reperiuntur oſtia, qvæ profundius in avibus qværenda, ubi, qvam in ullo alio genere longe majora, receptum majorem ſtylum per palati rimam emittunt; brevis hic admodum, qvæ foramina diſtingvit, membrana.

Vaſa palpebrarum.

X. *Vaſa palpebrarum, ſeu lacrymalia;* qvæ numero plura fontium habita ratione ad duo reducuntur genera: qvorum alia exteriora, externo oculi angulo accumbentia, glandulæ eundem angulum occupanti debentur multis dictæ innominatæ; interiora alia, qvam communiter lacrymalem appellant, glandulam pro fonte agnoſcunt; qvibus, qva nictent, data membrana, per eandem incedentium vaſculorum interius hiantia continent oſtia etiam in avibus ſtylum non excludentia.

Vaſa rajæ ſuperficiem exteriorem lubricantia.

XI. Liceat his adjungere, qvæ in raja mihi conſpecta, occaſionem ſubminiſtrante Clariſſimo Præceptore *Simone Paulli.* Multis illa nigris variegata maculis totidem foraminibus pertuſa tegitur cute, unde viſcidi humoris prodeunt guttæ, ſi foraminibus continuas preſſeris ſtrias, in qvas per eadem oſtia protruſa libere permeat ſeta.

Et hæc qvidem, qvæ nemini notata puto, vaſa ſunt, qvorum multa ſine ſectione conſpicua ſi notaſſet *Galenus,* ſuam *De Uſu Partium* l. 2. ingeminaſſet interrogationem, ubi legitur: *Num igitur miraris, aut non credis, aliqvid eorum, qvæ ſunt obſcuriora in Anatome, ignoratum fuiſſe ab eis, qvibus ne ea qvidem, qvæ ante Anatomen apparent, noſcuntur?* Sed cui hæc magni Anatomici probabitur exprobatio? Multa ſine ſectione conſpicienda ignoravit *Galenus,* nec dubito, qvin id generis alia multa ſuperſint, qvæ, qvod nimis forte obvia, noſtram impetrare neqveunt attentionem. Bene qvidem ab illo dictum, ſi mortalium neminem excepiſſet; cum vero prædeceſſoribus tantum ſuis ea objecerit, parum æqvus aliorum fuiſſe videtur cenſor, nec ad anguſtiſſimos humanæ cognitionis limites hoc in loco reſpexiſſe.

Vaſorum ante obſervatorum illuſtrationi ſerviunt ſeqventia.

I. Lymphatica illuſtrat tum *glandularum conglobatarum generalis fabrica,* tum *lymphaticorum vera in venas inſertio.*

Conglobatis id omnibus, qvas hactenus obſervare datum, familiare, ut arterias præter venasqve & nervos binas lymphaticorum in ſe contineant ſpecies, advehentem, puta, alteram, alteram evehentem; qvo a conglomeratis differunt, qvibus ſola evehentia contigere. Ipſa vaſorum radicibus undiqve affuſa ſubſtantia eam obtinuit conformationem, ut nulli, qvam renum corpori, commodius poſſit comparari, cui qvædam illarum, qva figuram, dico, non colorem, ſimillimæ. Exterius enim globoſæ, interius non qvidem pelvi qvadam excavatæ ſunt, ſeparationem tamen rite ſi aggreſſus fueris, inter protuberantia undiqve labra rimam invenies, qva egrediuntur una cum membrana qvadam lymphatici evehentis radices. In exteriori ſuperficie, ſi caute cultri aciem direxeris, videbis ex diverſis advehentibus lymphaticis numero multis prodeuntes ramos ipſam ſurculorum numeroſa propagine ſubſtantiam ingredi; qvod parotis conglobata in ovibus & vitulis eleganti ſchemate teſtatur. Harum glandularum reſpectu triplex lymphaticorum contenta ſua in ſangvinem reducentium exſurgit differentia; aliæ enim a primis fontibus, qvaleſcunqve illi tandem inveniendi, in glandularum ſparguntur ſuperficiem; qvædam e cavo unius glandulæ in alterius gibbum pergunt; reliqvæ ab harum glandularum cavo ad cavam uſqve exporriguntur. *Conglobatarum fabrica.*

Lymphaticorum vera in venas inſertio, ut multorum fruſtrata inqviſitionem, ita nemini, qvam Nobiliſſimo *Bilſio,* magis impoſuit. Primus ille veram hujus ſectionis videtur detexiſſe methodum, ſed & primus ſe inde paſſus ad abſurdas deduci opiniones. Alibi hæc plenius, ubi & errorum ejus manifeſta dabitur cauſa, jam ante in meis *Obſervationibus* indicata, & inſertionis varietas variis in figuris patebit. Hic paucis dixiſſe ſufficiat, in venas circa axillaris jugularisqve confinium utroque in latere lymphaticorum demonſtrandam inſertionem, & qvidem in dextro eorum, qvæ a dextris partibus anterioribus in brutis, ut e dextro pleuræ ſacculo, pede anteriori dextro & dextro capitis latere confluunt, in ſiniſtro vero præter dictis analoga ſiniſtri lateris vaſa, etiam ipſius, qvod inferiora omnia recipit, & ſuperioribus ante inſertionem ſociatur, thoracici. Communis omnium in ſiniſtro latere confluentium concurſus nec recepta- *Lymphaticorum in venas inſertio.*

culum conficit, nec valvulis donatus eſt, nec, qvod *Bilſius* nobis perſvadere voluit, per unicum ſua contenta in cavam exonerat oſtium. Nunqvam enim duobus pauciora, ſæpe vero tria, interdum & qvatuor deprehendi, &, ut certi eſſent ſpectatores, vere hac via in ſangvinem infundi & chylum & lympham, vaſa ita concurrentia ſimplici tantum preſſione modo lympha, modo lacte replevi, inde & varia agitatione ſangvini eo viam patefeci ſine ulla vel vaſorum vel valvularum læſione. Sed hæc paucis ante tacta, fuſius alio in loco tractabuntur, una cum modis valvulas lymphaticorum detegendi. Annulus vel labyrinthus Bilſianus nec in omnibus ſubjectis conſpiciendus, nec, ubi adeſt, eadem ſemper facie conſpicitur, vel qvicqvam eſt niſi lymphatici a permeantibus arteriis venisve aut nervis facta divaricatio.

Ductus Wirtzungianus.

II. *Ductui Wirtzungiano* illuſtrando ſervit in avibus facta obſervatio, qvæ hepatis qvoqve uſum reddit clariorem. In variis enim, qvas aperire licuit, avium ſpeciebus geminum vidi ductum pancreaticum, ductui bilario itidem gemino (qvorum alter a veſicula fellis hepati non accumbente, ab hepate alter) occurrentem, qvorum qvatuor vaſorum inſertio tribus variat modis, vel enim in unum omnia confluunt oſtium, vel cum ſuo qvilibet pancreaticus bilario commune oſtium ſubintrat, ita ut duobus tantum foraminibus pervium ſit inteſtinum, vel ſuus cuilibet ductui conceſſus exitus id efficit, ut qvatuor diverſæ ſecundum eandem rectam ſtylo pateant in inteſtina viæ. Nuper in Africana gallina vidi hepaticum ductum, ubi hepate exierat, ſimplicem, in progreſſu bifidum duobus inteſtinum adire canaliculis, qvod adeoqve tribus bilem e vaſculis recipiebat.

Non exiguam hæc, ut puto, lucem afferunt utriuſqve humoris & explicandæ utilitati & occurſui mutuo confirmando, qvem & illuſtrat pancreatici ductus in ipſum bilarium, anteqvam ad inteſtinum pervenerit, in media via inſertio ovibus peculiaris, qvam etiam poſt a diligentiſſimo *Highmoro* jamdudum deſcriptam & delineatam video.

Ductus Whartonianus.

III. De *Whartoniano* unum monebo, qvod & me fefellerat, meas cum ederem *Obſervationes:* ſcribit, ab appoſita (conglomeratæ conglobata) glandula in ipſam maxillarem inferiorem (conglomeratam) vaſculum pergere, qvod & ego initio ibi ſubſiſtere credidi, *Whartoni* fidens obſervationi, ſed ulterius poſtmodo ſectionem continuando obſervavi, inter dictæ maxillaris glomeramina ad conglobatam aliam penetrare, adeoqve lymphaticis Bartholinianis annumerandum.

Ex hiſce, ſimilibusqve & aliorum & noſtris obſervationibus ſeqventia partim corporis oculis ſubjecit experientia, partim mentis oculis ratio perſpexit.

I. Lymphaticis omnibus cum glandulis commercium eſſe; dicerem omnium lymphaticorum primam ſcaturiginem glandulas ſalutandas, ſed cum prima lymphaticorum Bartholinianorum origo, qvo plures admittit explicandi modos probabiles, eo ſit incertior, id ſaltem verum manet, nullum in corpore viſum lymphaticum, qvod non vel oriatur a glandula, vel in glandulam inferatur. *Lymphæ origo immediata & motus.*

II. Lymphatica omnia conglomeratis continua ſuum in certas cavitates effundere contentum, ut oculos, aures, nares, os, œſophagum, laryngem, ingluviem avium, &c.

III. Qvæ conglobatis annectuntur, ſua in cavam revehere contenta, vel immediate, vel mediantibus aliis conglobatis, & qvidem non modo circa axillarem ſiniſtram, cui qvidem totus communiter ſe jungit thoracicus, ſed & in axillarem dextram, qvo loco vellem, monſtraret nobis *Bilſius* roris ſui ad dextra capitis lymphatica diſtributionem, ſeu lymphaticorum ſuperiorum dextri lateris cum thoracico concurſum.

IV. Ipſas adeoqve glandulas omnes viſcera eſſe, per qvæ ſuas lymphatica diſpergunt radices.

Et hæc qvidem omnia pro veris habenda ſvadet ratio, qvia ſenſuum ea probat teſtimonio, probabilium vero tantum numero inferendas judicat ſeqventes, qvas ex inductione, licet non omnibus numeris abſoluta, elicit propoſitiones.

α. Qvocunqve corporis animalis loco aqvoſus qvidam naturaliter reperitur humor ejus ſuperficiem oblinens, eandem ſuperficiem lymphaticorum pertuſam oſtiis a conglomerata glandula oriundorum; unde colligere liceret, 1. eandem *aqvæ pericardii* eſſe originem, qvam Amici Clariſſimi de thymo obſervatio confirmare videtur; 2. nec *ſudorum* diverſos inde fontes, de qvibus in ſudoris examine latius, ubi omnium, qvæ cutem conſtituere poſſunt, partium inductione, & ſudoris cum aliorum humorum comparatione, cauſarumqve humores hoſce moventium examine probare licebit, ex hactenus obſervatis de cute probabilius nihil dici, qvam eſſe eam ſubſtantiam glanduloſam, hoc uno a reliqvis diverſam, qvod præter vaſorum capillaria etiam pilorum radices per corpus ſuum habeat diſperſas. Confirmant me hic rajarum cutem perforantia vaſa, unde veram

lubricitatis piſcium judico exſpectandam cauſam. Qvos ſine cuticula generatos narrant, eorum ſerum credo fuiſſe viſcidius, qvam qvod ad primum aëris contactum evaneſceret, vel eorum cutem perpetuo ſudore maduiſſe, ob humoris in corpore copiam, viarumve magnitudinem, aut impeditum ſeri per alias glandulas tranſitum. 3. *In ventriculis cerebri humorem* ſimili ratione ſecerni, cui favere videtur ab aliis ante notata in plexu choroide glanduloſa ſubſtantia. 4. Qvi *thoracis abdominisqve* partes oblinit, humorem originis qvandam habere analogiam. 5. Humoris, unde & *fit* & *nutritur fœtus*, non diſſimilia qværenda cribra. Qvibus enim cotyledones adſunt, animalia & adhærentes utero ſpongioſas carnes & ex harum cavernulis extrahendas facile ſine ſangvine chorii radices exhibent. In fele, ubi latus ovum cingit annulus, cum annulo ovum ab utero ſine ſangvinis effuſione ſeparavi, eratqve annuli ſubſtantia vere glanduloſa, qvemadmodum & ipſam uteri, cui adhærebat, ſuperficiem aſperam reddebant eminentiæ glanduloſæ. Sunt & in amnio qvorundam interius alba, qvæ ſangvinea vaſa recipiunt, corpuſcula. Sed hæc, ut dixi, ſuſpicionum cohortibus inſerenda.

β. Conglomeratarum lympham, poſtqvam in certas e vaſis effuſa cavitates, non ibi ſubſiſtere, ſed alio per alias vias intra corpus ablegari; ſic ex auribus & oculis in nares, e naribus in os, ex ore in œſophagum, &c. Hinc patet, qværendas etiam vias, per qvas evacuatur pericardium, cerebrum, thorax, abdomen; liceret etiam de oculi aqveo ſimilia ſuſpicari. Inter qværenda vias cerebri humorem excernentes collocavi; necdum enim res hæc determinata, licet apud Medicos nihil audiatur freqventius, qvam a capite ſubjectas in partes deſtillare humores. Adeſſe in cerebro, & qvidem ſemper, humores, freqvens cerebri ſvadet ſectio, qva vero iidem via emittantur, inventu non adeo facile. In eqvo cum pituitariam glandulam a plexibus innumeris, qvibus implexa, liberarem, vidi, me ſtylo patulam in venas habere viam, ut adeoqve in ſuſpicionem devenerim, per pituitariam glandulam tranſcolatum cerebri humorem venis ſine interventu aliorum vaſorum recipi, ſed inde per alias inqviſitiones non licuit eodem fine ſimilem repetere ſectionem.

Lymphæ origo mediata.

Ab oſtiis lymphatica continuavimus ad fontes, qvi ut in macrocoſmo dubia creant multa, ſic in microcoſmo multis ſcatent incertis. Ex hactenus obſervatis deducta ſeqvens opinio ſua non videtur deſtitui probabilitate, qvæ ſtatuit, *glandulas cribra eſſe*, hoc modo con-

formata, ut, dum ex arteriis in venas per capillaria tranſit ſangvis, liberatæ a ſangvinearum amplexibus ſeroſæ partes caloris vi per convenientes ſibi poros expellantur in capillaria lymphaticorum, concurrente nervorum extremis venis affixorum directione, elicito per ſenſuum perceptionem mentis imperio ſubjecta.

Et hæc qvidem de glandularum natura in genere dicta, qvibus addantur ſeqventia.

I. Lacrymæ videntur eſſe humoris palpebras naturaliter oblinentis, ex glandulis per manifeſta vaſa eo delati, certo animi motu aucta qvantitas; pari ratione ac delicatorum ciborum præſentia ſalivam movet appetenti, ut non opus ſit ad nervorum ſuccum, cerebri ſerum, arteriarum immediatam exſudationem confugere. An, qvos ſemel iterumqve in cornea obſervavi non ſine admiratione, pori qvandam aqvei humoris tranſmittant partem, nondum auſim affirmare: vidi qvidem per poros exeuntem humorem, ſed ipſine tunicæ adſcribendus ſubſtantiæ, an ab incluſa aqva deducendus, non facile ante ulterius examen determinavero, cum id nunqvam, niſi aliud agendo, tentatum. *Lacrymæ.*

II. Cum in ventriculum a ſitis in auribus, oculis, naribus, ore toto & œſophago glandulis ſeroſus ſemper defluat humor, interiorqve ventriculi cruſta, ſi prematur, humorem exſudet, alias cocta reliqva ſubſtantia durior ſit, nec ullos fibrarum agnoſcens ductus veri parenchymatis referat ſpeciem, qvis dubitabit de fontibus ventriculo ſeroſum humorem perpetuo ſubminiſtrantibus? Sed & cui non ſimul evidens, aliud in ventriculo ſolum præter reperiri calorem? Ad uſum ſi progrediendum, ad partes vocanda Chymia; ſed hic extra limites Anatomiæ non progrediar. *Humor ventriculi.*

III. Lac in mammis non aliter a ſangvine ſecerni, qvam alius in aliis conglomeratis humor, tam diu pro rato habebo, donec, qvi aliunde deducunt, ſuas vere deſcripſerint vias, certisqve circumſtantiis confirmarint. Clariſſimus *Antonius Everhardi* (qvi non videtur attendiſſe, unicam ſe tantum de lacteis mammarum protuliſſe hiſtoriam, & de freqventiore illarum obſervatione deſperaſſe, me vero non niſi de lacteis ad mammas loqvi, cum dico, ſemel illi tantum viſas) ad autopſiam ſemper provocat. Ego, qva potui attentione maxima, diſtenta lacte ubera ſubſtratis a muſculis ſeparavi, ſed lacte licet tumerent & mammæ & chyli receptaculum, hinc tamen ad illas nullum videre potui tranſitum. Sed illorum recitaſſe hiſtorias, tan- *Lac.*

tum non eſt refutaſſe. Hic per thoracem a thoracico ductu, a receptaculo ille per abdomen, tertius ab utero per abdominis muſculos, omnes autopſiam crepantes, chylum ad mammas deducunt.

Catarrhi. IV. Qvi glandulas catarrhorum dixerit fontes, ſymptomata explicabit facile, cum caput glandulis undiqve obſitum. Id ſe docuiſſe licet in ultimo *De Catarrhis* tomo credi velit Clariſſim. *Schneiderus*, tertium ſibi repugnantem invenit, ubi ipſe catarrhorum fontes membranas pronuntiat, modumqve deſcribit, qvo Natura in his membranis vaſorum extrema aperit, ſeroqve emiſſo, iterum claudit, nulla glandularum facta mentione. Qvod emendaturus ultimo tomo addit, Naturam, cum claudit vaſa, glandularum uti operculo. Sed non videtur attendiſſe Clariſſimus Vir, humoris fluxum eſſe perpetuum, qvantitatem vero fluentis auctam & qvalitatem mutatam morbos producere, adeoqve hoc operculorum inventum locum non invenire, glandulasqve non opercula eſſe, ſed cribra.

Et hæc qvidem de muſculis glandulisqve velut qvædam obſervationum ſpecimina ſufficiant.

Non pauca neglecta hactenus, qvædam etiam ἀδυνάτοις vel ab exercitatiſſimis Anatomicis annumerata, hic enucleata videtis. Liceret, forte non minoris momenti, alia dictis adjungere; ſed qvia non parum temporis reqviritur ad illa, qvæ promiſi, præſtanda, & hæc qvoqve vacuum ab aliis curis animum poſtulant, ne nominabo qvidem, contentus vel hoc ſpecimine demonſtraſſe, non omnia, qvæ dici poſſunt, noſtro ſeculo eſſe dicta, nec corporis tam hebetes oculos, qvin multa, qvorum cognitionem deſperarunt multi, etiam eorum ope diſtincte poſſint demonſtrari. Qvod ſi imitari volenti prima illico ſubjecta dictis non viſa reſpondere, ſecundum prius inſpiciatur, addatur & tertium, qvam falſi forte non falſum accuſetur. Nec enim uno hæc die obſervata, nec uno in ſubjecto viſa, nec adeo acta juveniliter, ut ut juveni inſultare pergat *Deuſingius*, qvin pleraqve magni nominis in hac arte multum verſatos & viros & ſenes habuerint viſis aſſenſum non denegantes ſpectatores.

XVI

DE ANATOME RAJÆ EPISTOLA

XVI

Ad
Excellentiſſimum
GVILIELMUM PISONEM,
Medicum Feliciſſimum,
DE
ANATOME RAJÆ
EPISTOLA

Vir Clariſſime,

NONDUM animo meo excidit illius diei memoria, qvo ad juvenis conatus Leidæ inſpiciendos cum Clariſſimo *Sylvio* tua ſponte accedens ad favorem tuum acqvirendum patentem ipſe primus viam monſtrares. Inauſpicatas inter aves corvos recenſeat antiqvitas, mihi ſane, qvam corvi aqvatici ſectio, nulla unqvam inſtituta auſpicatius, cum nihil tale ſperantem votis majore commodo bearit. Qvi enim potuiſſem mihi polliceri futurum, ut vir ab omnibus ſumme laudatus, qvi a nemine non expetitis curioſiſſimis ingenii judiciiqve monumentis ſuum æternitati jamdudum inſcripſerat nomen, eo ſe demitteret, ut non modo exercitium juvenile ſua ultro dignaretur præſentia, ſed & humaniſſimis amorem favoremqve verbis liberaliter offerret? Humanitatem illam ſingularem miratus ſæpius, cum inſuper animadverterem, prima tibi ſpecimina non adeo diſplicuiſſe, qvin & aliis noſtris experimentis Amſtelodami volueris intereſſe, ne tanta magni favoris teſtimonia non agnoſcere viderer, id mihi ex officio incumbere judicabam, ut me gratum, ſaltem litterula, teſtarer. Cui, ne nimis foret jejuna, cum aliam qvoqve ſcribendi materiam deſiderarem junctam, fruſtraqve diu

qværerem, ecce tandem commodiſſimam ab illo oblatam, cujus magno cum honore tuis in ædibus a te, me præſente, facta mentio. Placuit namqve Celeberrimo Viro, D. D. *Simoni Paulli*, Regio Medico & Prælato Aarhuſienſi, Præceptori Parentis loco venerando, ad rajæ ſectionem 21. Martii proxime elapſo me admittere, ubi cum varia viſu elegantia, nec ſcitu ſaltem nobis injucunda, nos in ſui admirationem abripuerint, credidi, me diuturnum ſilentium non alias commodius excuſaturum, qvam ſi tarditatem litterarum rerum novitate compenſarem.

Binæ nobis erant rajæ, ejuſdem utraqve ſexus, ſed magnitudinis diverſæ, licet earum altera, qvæ minor, pro mare a qvibuſdam habita, qvod inteſtini per vulvam prolapſus virgam mentiretur. Ad lancem appenſarum minoris pondus decem ſuperabat libras, cum majoris non infra triginta ſubſiſteret; cujus etiam, majoris ſcilicet, tranſverſa latitudo qvatuor erat ſpithamarum cum ſemiſſe, unaqve longitudinem, ſeu rectam ab extremo ori prætenſo apice ad caudæ initium extenſam, ſpithama ſuperabat. Qvadratam itaqve figuram diagonalium illi denegat inæqvalitas, nec vere ipſi competit rhomboidea, cum, qvæ ſibi æqvalia, latera parallelum non obtineant ſitum, ſed ad eundem angulum concurrant comprehendendum.

Inverſam intuentibus tota undiqve ſuperficies innumeris nigris perſperſa maculis (ex vitro nigro globulos dixiſſes, ni planæ fuiſſent) totidem iis continuas, minus tamen, qvod profundius ſitæ, nigricantes oſtendebat ſtrias, qvas non modo vaſorum adinſtar cavas, ſetæ per foramen, qvo pertuſæ maculæ, immiſſio arguebat, ſed & vere vaſa eſſe humorem lymphæ in conglomeratis aliorum animantium glandulis ſecretæ, non colore minus qvam conſiſtentia ſimilem, per ſuperficiem corporis excernentia, tum in ipſis contentus humor non obſcure indicabat, tum humoris vitreum oculi referentis per macularum oſtia expreſſio demonſtrabat manifeſte. Hunc illum eſſe humorem, qvi lubricam reddit rajam, facile mihi largientur, qvi ſenſibus ſuis credunt: ſi vero dicerem, me non ex hoc tantum phænomeno, ſed & ex pluribus aliis, in eam deveniſſe opinionem, ut exiſtimem, piſces alios lubricos omnes ſi non omnino ſimilia, ſaltem ipſis aliqvo modo analoga per cutem habere decurrentia vaſa, adeoqve minutas maculas qvaſcunqve per ſuperficies piſcium diſperſas eo nomine ſuſpectas habendas, iis vero abſentibus alia qværenda non tincta punctula; non omnium mererer fidem, in qvorundam

etiam incurrerem reprehenſionem, qvi me vitio Anatomicis admodum familiari obnoxium arguerent, utpote ab unica obſervatione ad generalem illico concluſionem abreptum. Nigros intra ductus ferri, nigraqve per oſtia liqvorem puriſſimæ adinſtar lymphæ ſplendentem excerni, miratus fuiſſem, ni in ovium & ore & naribus id vidiſſem ſæpius. Et hæc qvidem ſine ſectione cuilibet obvia, qvemadmodum & ipſe ſtriarum ſitus varius, qvi variis in locis elegantiſſimus.

Ab incumbentibus abdomini muſculis inſtratam ipſis cutem ſeparanti in cutem, aut ſaltem junctam cuti arctiſſime membranam, abeuntes tendinoſæ qvædam fibræ, ut magnam ſecandi difficultatem manibus pariunt, ſic oculos non exiguo recreant oblectamento; tranſverſo namqve ductu ſe alternatim ſecantes pulcherrimum conficiunt plexum, vel, ſi mavis, telam illi non abſimilem, qvam in telis non uſqve adeo ſubtili textura compoſitis detegunt microſcopia. Ad latera ſectionem longius accuratiusqve ſi continuaveris, etiam carnoſas inter fibras tendinoſas alias ad cutem adſcendere notabis. Sic & in media pubis cartilagine ſe interſecant adſcendentes muſculorum in oppoſitis lateribus ſitorum tendines. Obiter hæc tantum luſtrata, non minus ac ipſi abdominis muſculi, qvæ tamen non adeo acta perfunctorie, qvin viderim & ex illis qvædam, qvæ me in aliis, qvos ſecare contigit, muſculis obſervaſſe, ni fallor, noſti; carneas ſcilicet fibras in tendinem utrinqve deſinere, & poſſe in ventre muſculi longo breviſſimas obſervari carnes, numero tamen magnitudinis defectum ſupplentes.

Abdomine decuſſatim aperto elegantiſſimus hepatis ſitus in ſe unum noſtros vertebat oculos. Ipſum colore flavo ad pallidum vergente tinctum, qvod in ſummo abdomine ſub ſterno a dextris ad ſiniſtrum patet, ſpatium baſi ſua admodum tenui occupans tribus inde lobis, velut totidem lingvis, aut dentibus Neptuni fuſcinam imitantibus in inferiora excurrebat ad palmæ extenſæ longitudinem, uno per medium ventrem pylorum inter & ventriculum deſcendente, cum reliqvi duo ipſa utrinqve contingerent abdominis latera. Hos inter lobos duo hiabant intervalla, qvorum ſiniſtrum ventriculi replebat amplitudo, dextrum ſuperius veſiculam fellis continebat, inferius recipiebat cum inteſtini portione pylorum.

Cum vero totum ſiniſtra hypochondrii pars non poſſideret hepar, nec dextra lienem ſibi poterat vindicare, qvi intenſe rubens, cum tranſverſa ſummi abdominis latitudo hepate plena eſſet, medium

ſibi locum ſub medio hepatis lobo inter duo ventriculi orificia, vel, ut huic ſubjecto convenientius loqvar, ventriculi inter amplam cavitatem & pylorum elegerat, cui ſtomachi angulo & membranis, & per membranas currentibus ſangvineis vaſis jungebatur.

Ab altero pylori latere, qvem inferiora verſus reflexum inteſtinum facit, angulus pancreati commodam præbebat ſedem, qvod ibi non minus, qvam in altero animantium genere, ſuo ornatum erat ductu.

Ab ore ad anum, qva aſſumpta feruntur, via qvatuor, &, qvod excedit, ſpithamas longa pauciſſimis inflectitur locis. Primo circa finem ventriculi, ubi anguſtior redditus ad pylorum adſcendit, inde paulo ſupra pylorum, ubi verſus dextras intortum deſcendit inteſtinum, tertio in loco ingvini dextro aliorum animalium reſpondenti, ubi ſiniſtrorſum tendens circa ſpinam in recti definit veſtigium.

Lingvam in ore, ubi omnia plana, nec ulla vel ecphyſis eminet vel apophyſis, fruſtra qværes. Ori continuus ſine œſophago ventriculus unam eandemqve cum illo in mortuis videtur conficere cavitatem ſatis pro mole integri animalis vaſtam, ita ut amplus oris rictus, geminos ſimul pugnos tranſmittens facile, deglutiendorum corporum haberi poſſit menſura. Crediderim tamen, carnoſas fibras, qvæ in faucibus craſſæ admodum validæqve (velut ſpiralis qvædam linea, vel cochlearis) ſuperius orificium ambiunt, dum ſphincteris munere in vivis funguntur, ab ore ſtomachum parvo qvodam trajectu diſtingvere. Non tamen œſophagi nomine pars ea meo judicio venire poterit, cum, qvotqvot ego ſecuerim œſophagi fiſtulas, omnes duabus contrario ductu incedentibus cochleis fuerint contextæ, ut communia alia œſophagi taceam reqviſita. Ut vero ſit, unde conjicias, qvot animantium mortibus unum vivat animal, qvæ viſceribus ſuis condiderant viſcera, narrabo. Major aſellum minorem (Dorſch vocamus) ſeſqvi ſpithamam longum cum ſolea non multo minore famelica hauſerat alvo, ex minore paſſerem marinum præter, novemqve marinos cancros mediæ magnitudinis, integram ſpinam neſcio cujus piſcis, certe aſello ſupra nominato non minoris, excuſſimus. Non miror, mollem piſcium ingeſtorum carnem hæc intra clauſtra, tabidæ adinſtar, ſenſim diffluere, ſed cartilagines molliores fieri, imo ipſas cancrorum teſtaceas cruſtas comminui (qvod in pylori vicinia cremorem hinc inde rubore tingentes minutæ illarum particulæ non tam innuebant, qvam demonſtrabant), id vero mirarer magnopere, ſi a ſolo fieret calore nullius humoris interventu.

Certe interiorem ventriculi ſuperficiem integens cruſta (qvæ cocta reliqva ſubſtantia firmior duriorqve evadit, nec ulla certarum fibrarum prodit veſtigia) nulli, qvam glandularum ſubſtantiæ, mihi videtur ſimilior, & in vivis etiam viſcido qvodam obducta ſucco, ſi bene prematur, ejuſdem generis novum denuo ſuccum exſudat; ſed de hiſce nullus hic diſſerendi locus. Ut dextrum ventriculi orificium validus cingebat ſphincter, ſic ſiniſtrum arcte adeo clauſum, ut non niſi vi intruſo digito pateret via.

Pylorum ultra circa inteſtini flexum bini ductus tunicas inter lati in interiora inteſtini aperiebantur, nec eodem in loco, nec in eadem recta, ſed in partibus ſibi mutuo e diametro oppoſitis, qvorum pancreaticus alter, alter bilarius, inteſtinalis dictus, hic & xystico continuus & hepatico.

Inteſtini interior facies etiam ſua erat intecta cruſta, non tamen æqve ac in ventriculo craſſa. Si non diſſectum inverteris, proxime ſub pyloro videbis ex tunicis ejus elevatam qvandam qvaſi fimbriam ipſiſſimam cochleæ referre figuram, & ad cœci uſqve regionem deſcendere, non aliter ac in cœco cuniculorum inteſtino ſæpius amicis demonſtravi. Tres in hac cochlea fibrarum ſeries, exteriores duæ ab inteſtini tunica obliqve ad extremam ejus oram adſcendentes, intermedia una ſecundum longitudinem decurrens, ſed nec illa recta incedit; non procul a fine hujus cochlearis laminæ videtur exterior crepido qvaſi nervea, ita & albicat, & in filamenta reſolvitur, qvæ opinor nil eſſe niſi fibras ejus eo loco collectas & verſus inferiora intortas. Ne vero puſillum credas eſſe corpus, duos digitos, & qvod excedit, latum eſt, octo in verſum, uti dixi, inteſtinum orbibus implicans. Sic gyrorum, qvos in aliis longiſſima faciunt inteſtina, vices cochleæ in breviſſimo inteſtino ſuſtinent gyri. Qvod in his contentum cremoris inſtar liqvidum bilis admixtionem colore prodebat. In cœco, qvod breve admodum, & ſubſtantia parenchymati ſimile, præter viſcidam interiori ſuperficiei multis cavernulis aſperæ obductam humiditatem, nihil repertum. Unde non obſcura lux partis hactenus obſcuræ uſui videtur accedere, ut ex illis propediem eluceſcet, qvæ Celeberrimus *Simon Paulli* de hoc inteſtino meditata *Qvadripartito* ſuo brevi, Deo volente, recudendo fuſe inſeruit, ubi variæ & Anatomicæ, & practicæ hiſtoriæ ignobilem hucuſqve partem, & inertium otioſarumqve, qvas σημείου χάριν tantum factas dicimus, claſſibus adſcriptam, nec inertem, nec otio-

ſam, ſed alius, magisqve neceſſarii muneris, qvam σημείου χάριν factam eleganter docebunt.

Meſenterium hic qvaſi nullum, cum inteſtinum, cætera liberum, non niſi pauciſſimis in locis recipiat vaſa intra membranam minime latam procedentia, & hinc facilis ejus prolapſus, qvem initio dixi piſcatoribus impoſuiſſe, ut penem crederent.

Circa imum abdominis ad ſpinæ latera corpus rubicundum ſpithamam longum, digitum latum, ſed minus craſſum, varie ſectum fiſſumqve illi per omnia ſimile erat corpori, qvod in avibus analoga occupat loca, qvod in omnibus avibus, ſerpentibus, qvadrupedibus oviparis atqve etiam piſcibus renes appellat *Harvæus, De Generatione Animalium,* qvodqve *Ariſtotelem* aliosqve Philoſophos latuiſſe ibidem ipſe pronuntiat.

Remotis, qvæ nutritioni dicata, inſtrumentis, generationis organa in conſpectum prodiere, qvorum magna in hoc pari differentia, cum junior altera necdum concepiſſe videretur, altera grandior, ovis plena, partum non infreqventem viarum teſtaretur amplitudine.

Oviparum hoc animal ovis & generandis & excludendis duo diſtincta obtinuit organa, utroqve puta in latere unum, magno partium apparatu, nec artificio minori conſtructa.

In ovario præter ova, qvæ numero plurima, magnitudine diverſa, & præter integentes ova membranas, perqve membranas excurrentia ſangvinea vaſa, & omnia connectentes varios fibrarum plexus, etiam ſubſtantia, cui incumbunt, notanda, qvam primo qvidem intuitu pancreas ſalutares, is illi & color & mollities, diſſectam vero liqvore qvodam craſſo ſangvineis ſtriis album colorem inficientibus repletam invenies; dubito tamen, anne parenchyma fuerit tabefactum, cum expreſſo hoc ſucco remanſerit nihilominus membranæ accumbens ejuſdem coloris ſolidior ſubſtantia multis vaſis inſtructa, qvæ nulli, qvam glanduloſæ, magis videbatur affinis.

Licet uteri nomen, qvæ mereatur pars, in qva nempe conceptio fiat & conformatio, conformatiqve nutritio, deſideretur, pro utero tamen, licet parum commode, haberi poterit, qvod ab ovario non uſqve adeo remotum albicans corpus figura renem imitatur, a cujus cavitate media , qvæ totam fere latitudinem ejus æqvat, cloacam verſus uteri deſcendit collum ſatis & amplum & craſſum, ſurſum vero ad diaphragma uſqve cornu ejuſdem tendit, tenui admodum, ruptuqve valde facili ſubſtantia conflatum, cujus verus finis neutro

in latere qværentibus ſe ſiſtere voluit. Utrumqve cornu flatu diſtentum ad diaphragma uſqve continuavimus, ubi liberum aër inveniebat exitum.

Ipſum uteri hic ita diſtinctionis tantum gratia dicti corpus ab integente tunica liberatum diſſectumqve duplici conſtat ſubſtantia, exteriore albicante, interiore cineritia eandem fere colorum diverſitatem ſortita, qvæ cerebri medullam a cortice diſtingvit. Sed nec totum, qvod album, ejuſdem ſubſtantiæ corpus: invenies enim fibras plurimas, ab intima tunica ad extimam latas, in medio longiores ſenſim verſus latera decreſcere, & fibras præter in lateribus præcipue aliam fibris non diſtinctam glanduloſæ ſimilem. Diverſa diverſorum uterorum colla non confluunt in unum oſtium, ſed ſuo qvodlibet ornatum orificio ſarcinas uteri deportant in commune utriqve receptaculum, qvod alias cloacam in avibus dicunt, licet illud ab inteſtino ſeparet intergerino pariete membrana.

In juniori ſolum, qvod ovis ſubſtratum, alba ſua mollitie ſe conſpicuum reddidit, in utroqve latere, plurimas ejuſdem magnitudinis qvaſi aqva ſplendentes bullas ſibi mutuo oppoſitas circa medium ſui exhibens. Ipſi vero cum cornibus & collis uteri non niſi tenuiſſimum membranæ referebant tubulum, unde in communem cavernam exitus ſtylo flatuive non magis patens, qvam e caverna furſum; qvæ manifeſte nondum violata virginitatis clauſtra indicabant.

Ad maris litora, maxime cum contractis Oceani in refluxu limitibus arenarum termini extenduntur, inter alia, qvæ recedens unda in arido deſtituit, teſtulæ freqventes viſuntur figuram rectanguli oblongi exprimentes, cujus qvæ longiora latera, non ſecus ac in ſandapila, utrinqve parallelogrammi extra ſuperficiem ſunt extenſa. Inanes eas deprehendere qværentibus ſemper obvium, rarum vero ab aëre, vel aqva marina arenave diverſam in tumido illarum ventre ſubſtantiam reperire, qvod Clariſſimo *Simoni Paulli* contigit, qvi binas dictis ſimiles, viſcoſo humore qvaſi diffluentem tabe mytulorum ſubſtantiam referente turgidas, vidit excuſſo contento interiori ſua ſuperficie teſtarum, qvæ mytulos abſcondunt, cœruleum intus colorem imitari: & has ventriculo rajæ fuiſſe incluſas, qvi eduxerant, pro certo affirmabant. Qvi animalium hiſtoriam figuris exornatam nobis dedere, dictis ſimilem depingunt teſtam, cum incumbente illi ovorum racemo, voluntqve, & ova rajæ ova eſſe, & teſtam rajæ uterum appellandam: qvam id bene non dixero, mihi

autem cur minus videatur vero ſimile, rationes edam. Miror, *Rondeletium, Geſnerum, Jonſtonum,* tantos viros, hæc tam leviter examinata ſimpliciter adeo & abſolute pronuntiaſſe, nec ad uteri in animalium generatione diligentius attendiſſe uſum. Qvod, qvæſo, animal cum partu excluſum rejicit uterum? & qvot uteri tot ſufficerent ovis, qvibus numero carentibus rajarum in utroqve latere luxuriant ovaria? Sunt, fateor, in Anatomicis exercitatiſſimi Viri, qvibus ovum uterus eſt expoſitus, qvod ſi itaqve teſtula hæc rajæ eſſet ovum, ex horum ſententia etiam uteri mereretur nomen. Ne vero vel fallamur ipſi, vel alios videamur fallere, omnes & ovi & uteri imprægnati perſcrutemur partes, qvo pateat, an rite omnia perpenderint, qvi ovum uterum expoſitum dixere.

Ovi partes vel in pulli abeunt ſubſtantiam, ut albumen & vitellus, vel pullum ambiunt, ut involucra, qvorum alia ipſi animali adhærent, ut colliqvamento innatantem pullum claudens amnion, inteſtinis annexus vitelli ſacculus, & omnia involvens chorion, alia a vaſis ab omni parte libera ſunt, qvæ triplicia: tenuis nempe, qvæ chorion proxime ambit, membrana, & hanc excipiens craſſior alia, qvæ alba eſt, tandemqve omnia duritie ſua tutiora reddens exterior cortex.

Et hæ qvidem, qvas in ovo diſtinctas numeramus, partes ſunt; qvibus qvid turgens fœtu ſimile poſſideat uterus, inſtituta comparatione patebit. In utero qvidem & humores, unde fœtus exſurgit, colliguntur, nec deſunt, qvæ humores fœtumqve involvunt, fœtui continuæ membranæ, ſaltem in brutis triplices, cum allantoidem non in vaccino tantum, ſed & in ovillo integram ſeparaverim, etiamſi illam ſe in ovillo non inveniſſe fateatur *Harvæus* Exerc. 68. Cum vero hæc illa non ſint, qvæ uteri in viviparis veniunt nomine, ſatis liqvet, illarum ratione id ovo non attribuendum nomen. Qvid ergo reſiduum? Certe corticem una cum duabus membranis ab omni vaſorum communione liberis, qvæ ſola ſuperſunt, nemo uterum dixerit, niſi ſimul id uteri ſolum diceret munus, ut fœtum contineret, nullum præterea vel cum matre vel fœtu commercium habentis, qvod eſſet longe infra partis artificioſiſſimæ dignitatem: cum ſolus uterus id omne viviparis præſtet, qvod ab ovario, oviductu, ovo exſpectant ovipara.

Ea namqve illius ſubſtantiæ fabrica eſt, ut certis in locis arteriæ matris omnem ibi tranſudent humorem, qvem ab ovarii calice &

oviductus incraſſato, ſed molli & albicante corpore accipiunt ova. Ipſum vero corpus uteri non modo idem, qvod exteriora tria ovi involucra, præſtat, ſed &, a matre vitam habens, ſenſumqve & motum, ut fœtum, dum geſtat, moderato calore fovet, ita juſto partus tempore, ad eundem in lucem protrudendum confert plurimum, qvalis uteri motus in ſectione vivorum animalium manifeſtiſſimus. Adde, qvod omnis uterus, dum fœtum gerit, ovum geſtet: qvod licet ovo expoſito hac in parte cedat, qvod ante formatum fœtum non omnia, qvæ fœtui formando augendoqve neceſſaria, poſſideat, ſed eo ſenſim creſcente nova a matre accipiat incrementa, in eo tamen ſimile eſt, qvod nullum cum matris vaſis habeat commercium, ut ut contrarium hactenus a pleriſqve creditum.

Cum itaqve, qvæ utero cum ovo communia, non ſint ea, qvorum gratia id uterus obtinuit nomen, qvæ vero reſidua in ovo non niſi mortua qvædam involucra ſint nec a matre, nec a fœtu vitam habentia; cum ipſe inſuper uterus fœtui largiatur ea omnia, qvæ ab ovario, oviductu, ovo accipit pullus, imo verum intra ſe foveat ovum, juſtoqve tempore fœtum luci exponat, non poterit niſi admodum καταχρηστικῶς ovum uterus appellari.

Liqvet inde manifeſte, etiamſi dicta teſtula rajæ continuiſſet ovum, uterum tamen minime dicendam. Reſtat, diſqviramus, an certa dentur phænomena, qvibus evincere liceat, rajæ fuiſſe ovum. Si eſſent nobis, qvæ rajarum evagandi licentiam coercerent, vivaria, brevi decideret illam controverſiam autopſia; qvibus cum deſtituamur, merebimur veniam, ſi nihil, niſi qvod ex datis vere colligere integrum, admiſerimus. Ovaria rajæ & oviductus cum iiſdem in terreſtrium genere conſpiciendis organis conferenti haud facile ſvaſeris, ovum, qvod, dum ovario inhæret, rotundum eſt, inde prolapſum tenues qvatuor tenerasqve etiamſi longas ecphyſes aſſumpturum. A qvadrato non multum recedens interior ejus, qvod ovario proximum, corporis cavitas qvadratam teſtæ figuram planamqve produceret forte, ſed unde ejuſdem teſtæ deduceremus ecphyſes? Nec bene conveniunt inter ſe hiſtoriæ; fac viſum illi adhærere ovorum racemoſum, qvod pictura Authorum demonſtrat, qvid aliud inde colliges, qvam piſcem qvendam, forte rajam, ſua ſuper id corpus effudiſſe ova? At e ventriculo extracta nihil omnino probant, cum patens oris rictus obvia qvæqve abſumat. Potuiſſet, fateor, ejectum utero ovum hauſiſſe mater, propriæ prolis ſepulchrum, ſed ſpeciem

hoc qvandam veri habet, præterea vero nihil, cum eadem evidentia liceat dicere, zoophyti qvoddam fuiſſe genus a raja abſorptum. Qvouſqve enim vel in oviductu rajæ non reperta ſimilis teſta, vel non viſa ex tali tegmine prodire rajæ proles, cum magnorum virorum authoritatem non temere velim convellendam, aliorum hæc deferam judicio ulterius examinanda. Suffecerit id demonſtraſſe, dictam teſtulam, ſi vel maxime rajæ fuiſſet ovum, uterum tamen rajæ minime fuiſſe dicendam.

Et ſic qvidem relicto abdomine ad ipſa vitæ penetralia ferro aperiebatur via, ubi diſtinctum ab integente totam cavitatem membrana pericardium deſiderabatur. Totius formam, ſed inverſam, cordis imitabatur figura. Planum namqve & illud apice caput exprimens pro cauda carnoſam acceperat portionem a baſi aortæ orificium ſeparantem, laterum vero exſtantes angulos baſeos angulis eleganter referebat. Unus ipſi ventriculus, nec niſi una cor inter faucesqve ſita auricula, qvam cavæ tranſitus hoc nomine jubet appellandam. Carnoſis fibris contextum utrumqve corpus cocti docuit reſolutio. Qvo loco arteria ſe in ramos findit, oris tunicæ vicina latet glandula flavo colore tincta.

Pulmonum nec clarius hic, nec obſcurius, qvam aliis in piſcibus, veſtigium. In ore interius utroqve in latere qvinqve dehiſcentes rimas ſi inſpexeris penitius, branchiarum videbis latibula ita formata, ut hauſta ore aqva, his ubi emiſſa fuerit portis, iiſdem regredi neqveat, qvod exterius ſupra qvodlibet foramen deſcendens cutis illud tegat.

Jam vero qvid innumeri, qvibus ornatæ ſuperbiunt branchiæ, vaſorum ſangvineorum ordines aliud efficiunt, qvam ut contentus in illis ſangvis ab ambiente mutationem patiatur, ſive id contingat de ſuo aliqvid emittendo, ſive recipiendo externa, ſive una & eadem opera utrumqve præſtando. Et rem ipſam potius qvam rei vel conceptus, vel verba intuentes obſecro, videant, numne eodem res tandem recidat, ſive receptum cavitate ambiens eadem, qva admiſſum, via emittatur, ſive una via ingeſtum egeratur alia, modo in tranſitu vaſorum ſangvineorum contingat extrema, qvæ in pulmonibus aſperæ arteriæ ramos ambiunt, in branchiis prominent nuda. Namqve vel id ſaltem in reſpiratione certum, reqviri, ut ambiens, ſive id aqva fuerit, ſive aër, ſemper novum ad vaſorum feratur extrema. Bene qvidem videntur agere, qvi pulmones piſcibus denegant, cum diverſis organis diverſa competant nomina:

inde tamen non ſeqvitur, deeſſe piſcibus, qva ſimile qvid præſtent, partem. Nec male ſvadent, reſpirationis voce caute utendum, ſi derivationem reſpicimus; cum aqva ſpiritus nomine venire commode neqveat. Sed cum crediderim, terreſtrium vaſa non magis, qvi nos circumſtat, craſſum haurire aërem, qvam vaſa piſcium aqvam imbibere, qvis ſcit, anne idem illis præſtet aqva, qvod nobis aër, ſubtiliora ſuis amplexibus contenta corpora, qvæ qvorundam ſunt ſpiritus, illis largiendo, ſi alias largiuntur qvicqvam; nam ſi tantum recipiunt egeſta, res facilis & nulli controverſiæ obnoxia eſt.

Maximam parit difficultatem cordi denegatus alter ventriculus. Sed nec hæc, ſi alias rite perpendantur ſingula, tanti nobis erit. Demus, non omnem per branchias ferri ſangvinem, certe nec renes, nec hepar, nec alia viſcera omnis permeat ſangvis, & toti nihilominus eadem ſangvinis ſerviunt maſſæ. Sed preſſius: ut taceam embryones, qvibus qvid reponi poſſit, non me fugit, in adultis etiam, ſi credimus Anatomicis, a dextra in ſiniſtram auriculam via patens aliqvando reperta teſtatur, qvibuſdam in hominibus non omnem per pulmones tranſmitti ſangvinem. Sed ne ab inſolitis ad ſolita procedere videar, conſideretur, qvæſo, illa ſangvinis qvantitas, qvæ per branchias tranſfertur, & patebit, ſufficere illam, ut cum reliqvo inde ſangvine in auricula concurrens ad convenientem omnia proportionem facile reducat.

Cum itaqve, qvem in aliis animantibus pulmones, eundem ſangvini in piſcibus branchiæ præſtent uſum, licet hæ ab illis in qvibuſdam diſcrepent, non eſt, qvod affixam ſpinæ nigricantem ſubſtantiam hic ad partes vocemus, aut ad alia confugiamus diverticula. Animalium vitæ conſervandæ nihil æqve neceſſarium ac reciprocus ambientis ad ſangvinea vaſa acceſſus receſſusqve, qvod ſive fiat eo in interiora recepto (idqve vel multifidis aſperæ arteriæ ramis, ut in qvadrupedibus volatilibusqve, vel veſicarum cavitatibus, ut in ranis) ſive exterius prominula branchiarum vaſa lambente, eodem tandem recidit, cum pulmonum ubiqve præſtetur munus. Non itaqve, qvod pulmonibus deſtituantur, muti vocandi ſunt piſces, ſed qvod pulmones obtinuerint inverſos, adeoqve ab ambiente poſſint affici, etiamſi illud cavitate receptum per fiſtulam qvandam non ejiciant. Ad ſonum namqve ab animalibus edendum, id tantum videmus reqviri, ut per anguſtias tranſiens fluidum ſonorum in ipſo per obſidentia anguſtias offendicula tranſitu elidatur.

Excidiſſet fere viſu digniſſimum pupillæ operculum. Solis diſcum fulgentibus radiis undiqve coruſcantem vix elegantius depinxerit *Apelles,* qvam in rajæ oculo ex parte factum ab illa, qvæ colores omnes animat, Natura: uſqve adeo & radiorum, qvi medium ſtipabant orbem, accuratiſſimus erat ordo, & totius diſci aureus micabat fulgor; ſolum hoc deſiderabatur, qvod integram radii non abſolverent coronam, relicto, qvo iridi non minus aureæ ſuperius operculum nectebatur, arcu. Vere namqve uveæ pars erat, ideoqve inverſa parte more uveæ. fuſco colore imbuta. Miranda fabricæ elegantia, ſed & mirandus magis uſus. Qvod a palpebris (qvarum ſuperior plane nulla, inferior vix notanda) ſperare non poterat pupilla, id deſcriptum hic organum ipſi largitur, radios modo admittens, modo excludens pro diverſo agentium internorum externorumve impulſu. Uſqve adeo certis agendi organis non alligata eſt Natura, qvin diverſis idem præſtare munus valeat inſtrumentis, qvod hic uvea, pulmones, inteſtina demonſtrant. Cui non itaqve vel hoc certiſſimum erit, organorum diverſos modos qvo felicius pleniusqve a priori deduxerit ratio, eo minus in certis certam eam eſſe ſubjectis, niſi per experimenta rem determinaverint ſenſus.

Multa de re non ita magna protuliſſe videor: ſed & pleniora eadem reddidiſſem, & alia addidiſſem plura, ſi, cum in manibus eſſet culter, incidiſſent eadem, qvæ cultro ſuccedens calamus deſiderabat. Nec enim Clariſſimo Præceptori id erat otium, ut ad particularia omnia deſcenderet, nec mihi, raro piſcium ſectori, rajarum viſcera inſpiciendi unqvam data facultas, ante qvam eo me invitaret Celeberrimi ejuſdem Viri humanitas, cui, ut cætera ejus paterna in me merita, qvæ grata ſemper mente recolo, taceam, vel hoc ſolum nomine plurimum debeo, qvod hic occaſionem mihi ſuppeditaverit ea obſervandi, qvæ, ſi publici forte ſaporis non futura, tibi ſaltem non diſplicitura, ex doctiſſimis ſimul & ſvaviſſimis tuis de itinere Braſilienſi ſermonibus colligo, qvorum jucundiſſima ſemper mihi erit memoria: unde non obſcure perſpexi, qvo illius Terræ miracula ſcrutandi deſiderio flagraveris, qvantumqve rerum naturalium contemplatio paſſa diſpendium, qvod, qvo ibi moratus es tempore, per alias occupationes non potueris tuis ad ſatietatem frui votis. Qvæ tua nullos cum agnoſcat limites curioſitas, nec rarioribus ita ſe addixerit, qvin & in communiſſimis rariſſima deliteſcere judicet, non poterit meum hæc tibi tranſmittendi ſtudium jure accuſari.

Fuiſſet vero mearum partium eo ſingula cultu exornaſſe, qvi tuum ſine rubore ſuſtineret adſpectum. Sed licet urgens iter votis obſtiterit, nolui tamen, uſqve dum ad maturitatem pervenirent, ea ſupprimere; cum ab honeſto qvolibet idem mihi pollicerer, qvod tua certo promittit humanitas, qvæ res, non verba reſpicit, ubi vero etiam res opinione tenuiores, voluntatem metitur, non vires. Verbis te qvam officioſiſſimis ſalvere jubet, cujus hæc facilitati debentur omnia, Clariſſimus *Simon Paulli*. Juſſiſſet idem Celeberrimus *Bartholinus* noſter (a qvo tui honorifica ſæpe facta mentio), niſi ſua illum prædia nobis inviderent. Vale, Celeberrime Vir, & fave

Hafn. Anno 1664.
24. April. ſt. v.

Tibi addict.

NICOLAO STENONIS

XVII

DE VITELLI IN INTESTINA PULLI TRANSITU EPISTOLA

XVII

Ad

Celeberrimum

PAULLUM BARBETTE,

Practicum Experientiſſimum,

DE

VITELLI IN INTESTINA

PULLI TRANSITU

EPISTOLA

MULTA hoc ſeculum in Anatome protulit inſolita, qvæ ſi monſtris annumeranda, numeroſa monſtrorum ſobole non Africæ cederet Anatome. Et qvidni monſtra diceres, qvibus tanta cum monſtris affinitas? Sunt ibi, qvæ omnibus merentur monſtrari, movente admirationem rei novitate; nec deſunt, qvæ, qvod a ſolitis Naturæ legibus deficiunt, ſe exhibent vere monſtroſa; ſæpiſſime vero, ubi nihil in re monſtri, monſtrum fingit videntis præcipitantia. Sic & ipſi multa mirantur Afri, non alio ſane nomine, qvam qvod non ante viſa omnibus judicent monſtranda; interdum vero diverſi generis animalia communes ad aqvas confluentia jungens caſus hybrida parit, ut alias aliis modis in operando a ſolita via deflectens Natura monſtroſos illis edit partus: cum vero credita occurrentis deformitas ad primum illico adſpectum terrore pavidos in fugam vertit, monſtrum ſæpe fingunt ipſum viſum (forte nihil minus qvam monſtroſum) deformitate millies excedens, melancholicorum ritu & ſuperſtitioſorum, qvi inanem qvendam ſtrepitum, ludentes nubium figuras coloresqve, imo propriam ſæpe umbram & alia levia puerorum terriculamenta neſcio qvibus non ſpectrorum prodigiorumqve nominibus deſcribunt, credulisqve tanqvam vere

viſa prodigia, qvorum tamen longe diverſa facies, nullo negotio perſvadent. Ut vero Afros & credulos fallit terror, ſic Anatomicis imponit lætitia; dum viſum qvoddam prima ſpecie inſolitum, conceptæ opinioni favens vel novæ meditationi anſam porrigens, ad εὕρηκα ingeminandum illos propellit, nullo ad accuratius examen præmittendum conceſſo loco. Sunt & alii nonnunqvam animi motus, hic reticendi, qvi multos monſtroſorum ſcriptorum reddiderunt parentes. Odioſum foret, modernis ea exemplis illuſtrare, & ab antiqvitate petita qvi afferret, debitam illi venerationem videretur denegare. Nec opus aliunde accerſere, qvod in ſe cuilibet deprehendere promptum. Nec enim credo, qvenqvam Anatomes non nimis parcum nimisve infreqventem cultorem infitias iturum, qvin, ut interdum nova qvædam, qvædam videt a ſolitis diverſa, ſic non raro non viſa ſe vidiſſe ſibi perſvadeat.

Et qvid mirum, ubi animalium per experimenta cognitionem inveſtigare nituntur, qvos animi celeres motus velut turbine qvodam actos abripiunt, multa in Anatome venditari monſtra, nunqvam ab aliis, qvantumvis ſedulo id agentibus, invenienda? Animus, niſi pacatus fuerit, qvæ conſiderari & poſſunt, & debent, conſiderandis nullo vacabit modo; at niſi, qvantum per objecti licuerit vel ſubtilitatem, vel varietatem implicitam, minima qvævis notentur, prona in errorem & facilis admodum via eſt. Ut itaqve magna in ſectione omni, & circumſpecta opus attentione, ne ſua ſponte plus nimio mobiles oculos vaga mens a præſenti abducat; ita maxima adhibenda cautio, cum qvid receptæ communiter ſententiæ repugnans occurrit, ne qvis exteriori ſpecie deceptus ante victoriam cantet triumphum. Me aliorum veſtigia terruere admodum, nec auſim in re inſveta meis qvicqvam tribuere oculis, niſi, repetito freqventius ejuſdem rei examine, alios qvoqve rei, de qva agitur, gnaros viſorum habuere teſtes. Qvod ſi itaqve in iis, qvæ modo lecturus, qvid offenderis monſtro ſimile, certo credas virorum in Anatome exercitatiſſimorum oculis examinatum.

Ipſe inter monſtra numerare cæpi, cum viderem, *qvod in pullo vaſis umbilicalibus ex vitello receptum ad portam deferri hactenus creditum alimentum ex ejuſdem vitelli tunica immediate per ductum peculiarem medio inteſtinorum ductu excipi.* Abſurdum multis viſum, per os nutriri pullum: qvanto abſurdius, per ipſa nutriri inteſtina, maxime cum in nullo vitæ ſtatu id fieri, vel mentis unqvam finxe-

rint oculi? Nam dum ſine aëre in humoribus vivit animal, multi per venas umbilicales fieri voluere, & volunt etiamnum, nutritionem; alii per ſolum os docent, cui innatat fœtus, liqvorem in corpus demitti. In animali perfecto alimentorum oſtium os audit, ubi non modo ſolida fluidaqve per œſophagum deſcendunt, qvæ communis opinio eſt, ſed & ſpiritum aëreum pulmonibus æqve ac reliqvis corporis ſpiraculis omnibus hauriri Chymici qvidam non tam ſuſpicantur, qvam aſſerunt. In ægris narrant hiſtoriæ, multos odore ſolo ad aliqvot dies produxiſſe vitam, nec paucis profuiſſe clyſteres nutrientes: ſed cui vel ſomnianti incideret, ullum vitæ ſtatum eſſe, qvo in media inteſtina ingereretur alimentum?

Qvo itaqve peregrinum magis, magisqve παράδοξον viſum, eo ſtudioſius attendendum judicavi, ne fictum pro vero, pro naturali monſtroſum venditarem, donec omne dubium metumqve omnem tolleret ſibi ſemper conſtans in omnibus, qvæ conſului, ſubjectis obſervatio, qvæ in ſeqventibus conſiſtit.

Ut albumini ſic & vitello ſua eſt in ovo membrana, ſangvineis utraqve donata vaſis, qvarum, qvæ albumen includit, rupto ovo perit, altera intra abdomen recipitur, diuqve in pullo deprehenditur, etiam poſt triceſimum ab excluſione diem juxta obſervationes *Harvæi*. Vaſa utriuſqve membranæ umbilicos appellat *Ariſtoteles*, vultqve, qvi vitellum adit, umbilicum inteſtino tenui annecti: ſed ſive abdomen extra propendeat vitellus, ſive contrahentibus ſe ſenſim abdominis involucris introrſum lateat retractus, peculiarem habet, qvo mediante inteſtino annectitur, ductum, vaſis ſangvineis medium inteſtinum tranſcendentibus utrinqve ſtipatum, unde factum, ut ſangvinea vaſa tertium ductum involvendo inventioni ejus obſtiterint. Vitelli tunica ſacculum refert ampli ventris, ſed oris admodum anguſti, unde ad inteſtina medio fere principium eorum inter & finem loco vaſculum progreditur, vaſa ſangvinea craſſitie vix æqvans, inſuper colore ligamentum ſimulans, ut, niſi tranſmiſſus humor pervium argueret, nervum crederes. Modus, qvo inteſtina ſubintrat, non differt a ductus pancreatici inſertione: niſi qvod hic eidem affigatur lateri, qvo meſenterium inteſtinis adhæret, vitellus autem oppoſito latere viam patentem inveniat. Hac via liqvefactus & in limpidum liqvorem mutatus vitellus in inteſtina tranſfunditur decreſcente ſenſim cum contento continente, donec tandem, omni ſucco exhauſto, inteſtino adhæſerit tuberculum oblongum & cavum, qvod

ſolum ſemper manet vitelli veſtigium, ut hujus ope etiam in adultis poſſit demonſtrari, qvo loco per inteſtina ingeſtum alimentum. Ut vero eſſem de rei veritate tanto certior, inteſtinum aperui, preſſoqve ſacculo vidi per deſcriptum modo vaſculum tenuiorem primo liqvorem effundi ſubſeqvente eum craſſiore: qvod cum eodem ſemper modo ſuccederet tentanti, concluſi demum, hanc eſſe viam, qva pulli corpus vitellus ſubintrat, vereqve in inteſtinis æqve ac in ventriculo fieri, qvam vocant, chylificationem. Sed qvo pateant omnia plenius, qvæ me in hujus rei examen detulit, occaſionem brevibus referam.

Diu in ſuſpenſo dubium me detinuit hepatis officium, nec in hanc uſqve horam vel aliunde diſcere licuit, vel experimento videre, qvæ ad illam rem certo determinandam ſufficerent. Qvi, qvod ingenio valent, ſoli omnia deferunt rationi, cum ſua ſinguli tantum non dictatorie pronuntiare videantur placita, & qva explicandi modum toto inter ſe qvi diſſident cœlo, qva probandi fiduciam conveniant, non poterit qvis anticipationem mentis vitans, nec ulli ſectæ addictus, qvam e multis opinionem ut certiorem tuto aſſumat, facile divinare. Experimentis vero faciendis qvi ſe totos addixere, tantum abeſt omne ſuſtulerint dubium, ut opus omne multo reddiderint intricatius, dum, qvas illa veritatem inveſtigandi methodus præſcribit, leges vel non obſervent incauti, vel gnari ſcientesqve ſpernant ad arreptam ſemel ſententiam, cui tanqvam ſcopulo ſemper hærent affixi, cuncta & viſa, & non viſa referentes. Id qvod non alia in materia elucet clariùs, qvam ubi de chyli via qvæſtio inſtituitur. Tandem confirmata lactis vera lymphæqve via, licet rationis dubia removiſſe videretur experientia, multorumqve experimentorum fallaciam eadem imitantium induſtria detexiſſe, hæc nihilominus manſere, qvæ ancipitem redderent veritati ſtudentem animum. Primo, qvod non conſtaret, omnem hac via ferri chylum, cum id tantum docerent viſa, ex alimentis aſſumptis partem per inteſtinorum tunicas tranſcolatam per lactea in cavam ſurſum mitti; jam vero qvis ſpondebit, reliqvum omne in excrementum abiturum? Qvis falſi convicit omnes illos, qvi credunt, venarum id eſſe munus, ut non tantum ab arteriis tranſfuſum revehant ſangvinem, ſed &, qvicqvid earum oſtia ſubintrare aptum, una cum ſangvine cordi inferant? Id qvod ſi admiſeris in omni reliqvo corpore, qvæ ratio inteſtinis ſimile qvid denegandi? Huic dubio non minoris momenti aliud

ſe adjungit, qvod nempe in omni animalium genere de hac eadem re non facta inqviſitio. Qvod ſi itaqve invenienda animalia, qvibus denegata lactea, vel ſi notandum vitæ tempus, qvo ſangvinea vaſa acceptum extremis ſuis alimentum in jecur primo tranſmittant, qvidni aliis etiam ſimilia tribuenda, præcipue qvouſqve nihil repertum, qvod contrarium demonſtret? Qvanti hoc faciendum, licet a paucis notatum, dubium, ut alia taceam, qvæ ab hoc fonte petita movere poſſem non pauca, ſolius *Harvæi* docebit exemplum, qvi, qvod credidit, in avium genere vitellum per vaſa umbilicalia in hepar ferri, venas lacteas rejecit. Hinc Exerc. 21. ait: *Et ſi valet argumentum a ductu venarum umbilicalium (qvas ad jecoris portam uno aut altero trunco terminari diximus), pullus jam eodem prorſus modo nutritur, alimento ex vitello per vaſa umbilicalia attracto: qvo poſtea chylo ex inteſtinis per venas meſaraicas traducto alitur. Vaſa enim utrobiqve ad jecoris portam terminantur, ad qvam nutrimentum pariter attractum deferunt. Ut ad venas lacteas in meſenterio (qvæ in pennatis nullibi reperiuntur) confugere non ſit opus.* Qvæ mihi verba non levem injecere ſcrupulum ſtatuenti, ſi in pullo id venæ munus obeunt, non in aliis facile animalibus, vel alio vitæ tempore eum illis honorem detrahendum. Hinc factum, ut nunqvam auſus hepati adverſari, licet nec unqvam ejus ſecutus fuerim partes. Tanti mihi namqve fuit authoritas *Ariſtotelis Harvæi*qve, ut illud de vitelli in hepar diadoſi per umbilicalia vaſa tanqvam certum admitterem, qvandoqvidem rationi non viderem repugnare.

Cum vero in illorum hiſtoria, qvid exhauſto vitello de ſacculo fieret, & qvædam alia non magni qvidem momenti, ad circumſtantiarum tamen plenam recenſionem facientia deſiderarem, incubanti ovis gallinæ unum ſubtraxi, cujus teſtam jam tum ruperat exitum maturans pullus.

Deductis involucris latentem prodidit vitellum abdominis tumor. Non recenſebo, qvæ circa modum, qvo abdomen involucris obducitur, notanda ſpectatori, qvam lectori, gratiora futura, ſed miſſis omnibus dicam, dum vitelli e ſacculo in hepar credulus rimarer vias, non qvæſitum ex eodem ſacculo in inteſtina tranſitum ſe mihi ultro obtuliſſe inveniendum. Sic ſæpius aliorum aſſerta nobis oracula ſunt, donec, qvantum a vero recedant, accuratius examen demonſtraverit. Legeram *Ariſtotelis* ſententiam confirmantia *Harvæi* verba, videbamqve utriqve faventem rationem, qvo effectum, ut

ne dubitandi qvidem vel minima mihi oriretur ſuſpicio, donec totum momento qvaſi ſubverteret autopſia, qvæ authrix, ut & hoc ſubducto tibicine, hepatis tanto magis jam vacillet thronus. Cum enim fœtus qvilibet, cui innatat, humorem ore aſſumat, cum pullus albumen ore, vitellum excipiat inteſtinis, nullum video argumentum, qvod certo demonſtret, ex humoribus partem hepati prius, qvam cordi, inferri per vaſa umbilicalia, licet, qvæ idem ſpecioſe ſvadeant, minime deſiderentur. Nec enim partium ego ducor ſtudio, nec hepati unqvam bellum indixi, ſed id tantum ab ejus patronis optavi efficiendum, ut experimenta darent, qvibus rationis confirmarent inventa. Hinc licet, datis jam manifeſtis & patentibus alimenti viis, vaſorum umbilicalium muneri hos præfigere liceret limites, ut ſuo calore, forſan & per vaſorum extrema tranſſudante qvocunqve demum fluido, humores nutriendo corpori tantum redderent aptos, nullos vero in corpus deferrent; dum tamen de eo, qvod venarum oſtia recipiunt (an ſangvis tantum ſit, an vero &, præter ſangvinem, admota qvælibet poris congrua) nondum determinata lis, eo audaciæ progredi, res infida videretur.

Eſt autem ponderis non adeo parvi qvæſtio, qva diſqviritur, qvo modo parti corporis admota qvæcunqve ſuas in corpus tranſmittunt partes.

Sunt, qvæ illas recipere poſſunt, venæ, nec deſunt in multis animalibus, qvibus idem munus tribuerent nonnulli, lymphatica: qvod ſi vero volueris per poros cutis, membranarum, muſculorum, oſſium ad intima penetrare viſcera, vel ſubtilem hic tantum intelligas oportet materiam ut in actu frigidis calidisve, qvemadmodum & in magneticis, vel ipſas partes, adeo vi morbi relaxatas, ut vera ſit diapedaſis, niſi forte ea fuerit materiæ acrimonia, ut obſtantia qvæqve, vel ferrea, perrumperet. Viſa, fateor, bilis non rupto folliculo vicina loca flavo colore inqvinaſſe, & obſervatum per veſicam bubulam tranſſudaſſe aqvam, repertusqve intra ſuſpenſam in ſtatuariorum officina veſicam lapidum cæſorum pulvis, qvi clauſum arcte veſicæ orificium non facile penetraſſet: ſed, qvod vel laxatis morbo membranarum fibris, vel eiſdem exſiccatis adſcribendum, locum in vivo & ſano non invenit, ubi & ſpiritu repleta ſunt omnia, & humore. Qvod itaqve cordialia cordis regioni imponantur epithemata, non aliam video rationem, qvam qvod venarum ab illa cutis parte ad cor uſqve extenſio brevior ſit, qvam ſi manibus idem applicares,

qvandoqvidem, alias qvi pilam purgantem manibus ægrorum jubebat continendam, non difficilius alvum moverit, qvam qvi ejuſdem facultatis ungventum umbilico illineret, ut adeoqve & hic & ibi nulla fiat per ſolidorum poros penetratio, ſed tantum vaſis receptarum partium cum ſangvine mixtio, unde ſperatus reſultat effectus. Eadem cantharidum ratio, nec vere dicti veneni diverſus modus. Sed longum foret, qvæ generalis hæc qvæſtio involvit, omnia evolvere. Cum itaqve, qvæ exterius admoventur corpori, venarum oſtiis recepta illarum ſeqvantur ductum, qvidni etiam, qvæ membranis uteri continentur, liqvida ſui partem umbilicalibus offerrent? Specioſa hæc ratio, ſed non ubiqve locum inveniens. Qvis enim crederet, in renibus nuper a ſangvine, aut undecunqve demum, ſaltem ab aliis utilibus partibus ſecretam urinam in veſica iterum a venarum extremis reſorberi? Qvod alias omnino largiri tenetur, qvi venis omnibus eam dederit fabricam, ut præter ſangvinem admota alia, modo ingredi apta, excipiant. Qvid enim urina majorem penetrandi vim poſſidet, qvæ exterius admota ſuas illico exſerit vires? Pari ratione de bile, de aliis excrementis liceret concludere. Qvod ſi hic Naturæ propria excrementa abominantis faſtidium objeceris, parum efficies, cum multum de prudentia ejus detraheret, ſi, qvæ in veſica prudens adeo eſt, in cute tam parum cauta deprehendatur, ut, qvod in veſica noluerit vaſis recipere, in cute ſangvini patiatur immiſceri. Qvod ſi autem oblinentem interiora veſicæ pituitam ad partes vocaveris, commodiorem videreris afferre rationem. At vero ſi in veſica urinaria, ſi in bilis folliculo, ſi alibi admiſeris impedimenta prohibentia, ne ſangvini jungatur, qvod alio corporis loco penetraret libere, qvis nobis interiorem membranarum fœtus ſuperficiem adeo probe cognitam perſpectamqve dabit, ut auſit ſuam libere pronuntiare ſententiam? Ut autem de umbilicalibus dubia res, ſic de portæ ramis parum certa veritas, tum ob datas modo rationes, tum qvod non lacteæ tantum lymphaticæqve venæ, ſed & glandulæ conglobatæ meſenterii in avibus piſcibusqve necdum mihi viſæ, ſive id obſervantis contigerit culpa, ſive rei in iſtis animalibus defectu, qvod necdum velim decernere. Qvod ſi jam certo conſtaret, eſſe animalia, qvorum inteſtina omnem chylum venis rubris meſenterii committerent deferendum, non poſſes in aliis animalibus chyli (qvo nomine intelligo, qvicqvid ab ingeſtis alimentis ſecretum per inteſti-

norum tunicas exprimitur vel in lactea vel in rubra) partem hepati denegare, niſi demonſtrares, vel intimam inteſtinorum villoſam tunicam, cujus villi in cylindro hoc tortuoſo axem omnes reſpiciunt, vel aliam, diverſo modo in diverſis fabricatam, in hoc ſubjecto venis ſangvineis mandare, qvod in alio lacteis totum deſtinavit. Sed dubium qvod eſt, relinqvamus dubium, donec longior dies experimenta dederit vel muneris priſtini partem hepati reſtituentia, vel omni chyli honore demonſtrantia indignam. Licet parum ad illius faceret dignitatem, vel ſi omni chylo liberum permitteret tranſitum, qvandoqvidem, partes ſolidas (qvæ vel ſangvinem impellunt, vel ſecernendorum cribra ſunt) ad ſangvinem aut generandum aut perficiendum qvicqvam conferre, hoc ſeculo credere pleriqve deſierint. Sed qvo me abduxit hepar? Novam mihi & tantum non monſtroſam alimenti in pullo viam tibi ſignificare volui, ſimulqve qvæ me occaſio ad eam deduxit inveniendam, qvæ nude adeo ſe proponi non patiebantur, qvin hepatis ſimul habenda ratio; qvandoqvidem vitellum in proprio ſacculo contentum ambiant umbilicalia, in inteſtina receptum portæ contingant rami, utraqve vaſa cum hepate commercium habentia. Vale, Vir Celeberrime, & ama

Hafn. 12. Jun. ſt. v.
An. 1664. T.

NICOLAUM STENONIS

NOTES

I

DE PRIMA DUCTUS SALIVALIS EXTERIORIS INVENTIONE & BILSIANIS EXPERIMENTIS.

This Letter from *Steno* to *Thomas Bartholin*, dated Leyden, April 22, 1661, is found in *Th. Bartholini Epist. Medicin. Cent. III.* Hafniæ 1667. pp. 86—95, numbered *Epist.* XXIV.

P. 3. l. 1. from top.

THOMÆ BARTHOLINO] *Thomas Bartholin* (1616—80), son of *Casper Bartholin* the elder, was born in Copenhagen. He spent nine years of study abroad and took his Doctor's degree at Basle in 1645. Shortly after his return to Copenhagen he was appointed Professor of Anatomy at the University of that town (1648), but as early as 1660, when only forty four years old, he was exempted from delivering lectures on account of his declining health. With the title of Honorary Professor he retired to his estate in the country, and from there he constantly made his strong influence on the University felt. In 1670 his estate was burned down and the whole of his library together with numerous manuscripts was destroyed by the fire. *Bartholin* was given many offices of trust, *inter alia* he was a Judge in the Supreme Court and Physician in Ordinary to King *Christian V.* — *Bartholin* was an influential man of high standing in his own country, the University of which was essentially under his dominion. His reputation spread outside his native country to the whole of the then world of learning. This is accounted for partly by his personal acquaintance with most of the contemporary scholars interested in Natural Science, with whom he kept up an extensive correspondence, partly by his versatile literary activity. Adding a great many amendments, *Bartholin* edited his father's Anatomy; it was published several times, and, translated into many languages, it was for a long time the manual most in use in Europe. Besides, *Bartholin* published various large collections of letters, of medical journals and of short treatises on Natural Science, among which the collection that may be considered the first periodical of Natural Science — *Acta Medica & Philosophica Hafniensia*, published from 1673 till 1680 — was looked upon with great esteem. As an original investigator *Bartholin* was of less merit, though one important discovery, viz. that of the lymphatic vessels, was made by him in conjunction with his prosector *Michael Lyser*. The same discovery had been made, however, a very short time before by *Olof Rudbeck* in Upsala, yet with-

out *Bartholin's* knowing about it. For this subject see *Gosch, Udsigt over Danmarks zoologiske Literatur*, vol. II 1. Kjøbenhavn 1872. pp. 87—131, where the controversy into which *Bartholin* was led by his discovery, is fully discussed. A complete list of *Bartholin's* writings will be found in *Gosch*, vol. III. Kjøbenhavn 1878. pp. 13—61. See, besides, *Dansk biografisk Lexikon*, vol. I. p. 564. *(Jul. Petersen.)*

P. 3. l. 2 from bottom.

ſimilis omnino ductus] *Ductus Whartonianus.* See *Adenographia ... Authore Thomâ Whartono.* Londini 1656. c. XXI p. 129.

P. 3. l. 1 from bottom.

a *Caſſerio] Ivlii Casserii ... De Vocis Avditvsq; Organis Historia Anatomica ...* Ferrariæ 1600. tab. V p. 27. d.

P. 3. l. 1 from bottom and p. 4. l. 1. from top.

ex tuis ... *Inſtitutionibus] Thomæ Bartholini ... Anatomia ... Reformata ...* Lugd. Batav. 1651. lib. III c. XI p. 362.

P. 4. l. 4—5 from top.

a Clariſſimo *Sylvio] Frans de la Boe Sylvius*, born in Hanau, studied at German universities. Having taken his degree at Basle in 1637 he returned to Hanau, where he lived as a medical practitioner, continuing his scientific studies at the same time; in 1638, however, he was entered at the University of Leyden as a medical student. For some time he was a physician in Amsterdam, where he made the acquaintance of *Descartes*, and in 1658 he became professor of *Medicina Practica* in Leyden. He died in 1672 and is especially renowned for his investigations of the brain *(fossa Sylvii)*, of the glands (the classification into *glandulæ conglobatæ* and *conglomeratæ)*, and of physiological chemistry. See *Biogr. Woordenboek der Nederlanden.* vol. XVII p. 1142, the Introduction to the present Edition and note to [II] p. 20.

P. 4. l. 5 from top.

a ... Dno. *van Horne] Joan van Horne*, born at Amsterdam in 1621, studied at the University of Utrecht, travelled in Switzerland and Italy, and was afterwards made Doctor in Basle; having stayed for some time in France he eventually became Professor at the University of Leyden. He died in 1671. He made the discovery of the thoracic duct independently of *Pecquet (Novus ductus chyliferus nunc primum delineatus.* Lugd. Batav. 1652.). See the Introduction and *Biogr. Woordenboek der Nederlanden.* vol. VIII p. 1269.

P. 4. l. 5—6 from top.

exhibitus publico ductus ille fuerat] Compare two letters from *Ole Borch* to *Thomas Bartholin*, dated Leyden March 3, and March 20, 1661, found in *Epist. Medicin. Cent. III.* Hafniæ 1667. No. LXXXV pp. 362—63 and No. LXXXVII p. 376.

P. 4. l. 7 from top.

Gerard. Blaſius] Gerard Blaes was the son of *Leonard Blaes*, the Dutch architect to King *Christian IV* of Denmark. He studied medicine in Copenhagen and Leyden and was made Doctor at the latter place. By the time of *Steno's* arrival in Amsterdam he was physician at the

Athenæum there. He died in 1692. *Blaes* displayed a vast literary activity; his commented edition of *Vesling's Syntagma Anatomicum*, Amsterdam 1666, and his *Anatome Animalium, ibid.* 1681, are his best known publications. See the Introduction and *Biogr. Woordenboek der Nederlanden.* vol. II p. 598.

P. 4. l. 10—11 from top.

in ſuis ad *Eyſſonium* litteris] *Henricus Eyssonius*, born in Groningen, was in 1658 made Doctor and two years after Professor of Medicine at the University of his native town. He died in 1696. See *Biogr. Woordenboek der Nederlanden.* vol. V p. 311.

P. 4. l. 12—13 from top.

de *Medicina Generali* ſcripto] *Steno* made his discovery on April 7, 1660. The two letters mentioned above (see note to p. 4, l. 5—6 from top) of *Ole Borch's* in which the latter mentions *Blaes'* intention of claiming the right to the discovery, are dated March 3 and March 20, 1661. This letter of *Steno's* has the date of April 22; in the meantime *Gerardi Blasii... Medicina Generalis.* Amstelædami 1661, had appeared. In the Preface of this book the following passage is found: *In Re ipſâ vix aliquid novi, quod conſiderationem mereatur. Quid acceſſerit, facile ipſe obſervabis, hæc noſtra cum aliorum hactenus editis ſcriptis conferens. Vnicum hoc moneam cogor, Ductus ſalivales in maxillâ ſuperiori ſeſe exhibentes, de quibus pag. 64. mentionem feci, inventis novis accenſeri deberi, utpotè antè annum, & quod excurrit, à me, privatis exercitiis anatomicis occupato, in capite vitulino primùm repertos, ac dein, occaſione commodâ ſe offerente, in Noſocomio Leydenſi, à Pr. Iuvene Nicolao Stenonis, Hafnienſi, Diſcipulo meo induſtrio, in capite humano, ante paucos menſes, Spectatoribus exhibitos.* The same work has, *Cap. XIII. De Salivâ*, pp. 63—64: *Saliva humor eſt, calidus, moderatè, & ſiccus, tenuis, ſpumoſus, albicans, dulcis, ex ſero conſtans, caloris ope à maſſâ ſangvineâ in glandulis maxillaribus ſegregato, & hinc per ductum ſalivalem in maxillâ ſuperiori æquè ac inferiori notabilem; ad glandulas oris anteriores delato, ut inde motu linguæ expreſſus, guſtationi, maſticationi, deglutitioni, imò ad ventriculum delatus chylificationi inſerviat.*

P. 4. l. 15 from top.

per Fratrem] *Gerard Blaes'* brother, *Joan Blaes*, was a barrister and an amateur poet.

P. 4. l. 6—7 from bottom.

Whartonum ad partes vocare] *Adenographia... Authore Thomâ Whartono.* Londini 1656.

P. 4. l. 1 from bottom.

Dn. *Jacobo Henrico Paulli] Jacob Henrik Paulli*, born 1637, was the son of *Simon Paulli*, the Anatomist and Botanist. Having been the prosector of *Thomas Bartholin* for some time he went to study abroad. He became *Professor Designatus* of Anatomy at the University of Copenhagen but was eventually appointed Professor of History; abandoning this chair he went to Holland and England as a diplomatist; he was afterwards knighted under the name of *v. Rosenschild.* See *Dansk biografisk Lexikon*, vol. XIV p. 298. *(L. Laursen.)*

P. 5. l. 2 from bottom.

in illa ... diſputatione] *Disputatio*

Anatomica De Glandulis Oris, & nuper obſervatis inde prodeuntibus Vasis Prima (& Secvnda). Lugd. Batav. 1661. The defence of these dissertations took place on the 6th and 9th of July; they are to be found as No. [II] of the present Edition. See moreover List of *Steno's* Writings in vol. II.

P. 6. l. 12—13 from top.

ſalivales glandulæ duas, interior unam, alteram exterior, ſibi aſſociarunt] *Glandula salivalis exterior* and *interior* ɔ: *glandula submaxillaris* and *sublingvalis.* See *Adenographia... Authore Thomâ Whartono.* Londini 1656. c. XXI p. 128.

P. 6. l. 16 from bottom.

tibi, ut qvi primus hæc vaſa detexiſti] *Pecquet* in 1649 found the thoracic duct in a dog (*Joannis Pecqveti ... Experimenta Nova Anatomica, Qvibus Incognitvm Hactenvs Chyli Receptaculum, & ab eo per Thoracem in ramos uſque Subclavios Vasa Lactea deteguntur...* Parisiis 1651). The thoracic duct was found independently by *van Horne,* that published the discovery in 1652 (see note above to p. 4. l. 5 from top). *Thomas Bartholin* was the first who demonstrated the duct in man: *De Lacteis Thoracicis in homine brutisq; nuperrimè observatis...* Hafniæ 1652. This was followed by his discovery of the lymphatic vessels: *Vasa Lymphatica, Nuper Hafniæ in Animantibus inventa, Et Hepatis exseqviæ.* Hafniæ 1653.

P. 6. l. 11 from bottom.

a *Bilſii* partibus] For an account of *Lodewijk de Bils* see *Biogr. Woordenboek der Nederlanden,* vol. II p. 555 and the Introduction. *Bils* maintained that all the watery fluids and secretions of the body come from the thoracic duct. Concerning his controversy with *Thomas Bartholin,* see those of *Steno's* writings which follow immediatly after this Letter, and furthermore *Gosch, Udsigt over Danmarks zoologiske Literatur,* vol. II 1, Kjøbenhavn 1872, pp. 117—131.

Thomas Bartholin's reply to this Letter from *Steno* is found in *Epist. Medicin. Cent. III.* Hafniæ 1667, No. XXV pp. 95—98.

II

DE GLANDULIS ORIS & NOVIS INDE PRODEUNTIBUS SALIVÆ VASIS.

Steno's Disputatio Anatomica De Glandulis Oris, & nuper obſervatis inde prodeuntibus Vaſis was published in Leyden in 1661. It was reprinted in 1662 as the first of the four Treatises found in *Nicolai Stenonis Observationes Anatomicæ, Quibus Varia Oris, Oculorum, & Narium Vaſa deſcribuntur, novique ſalivæ, lacrymarum & muci fontes deteguntur, Et Novum Nobiliſſimi Bilſii De lymphæ motu & uſu commentum Examinatur & rejicitur.* Lugd. Batav. 1662. The text of this second edition, which was corrected and somewhat enlarged by *Steno* himself, has been made the basis of the present Edition. In the following notes attention is called to any divergency of text in the two editions, unless being quite unconsiderable.

P. 11.

This Dedication is found both in the edition of 1661 and in that of 1662;

but the wording is somewhat different in the two editions. In the dedication to *Otto Krag* the words . . . *graviſſimo, arcis & territorii Neoburgenſis in Fionia*[1]) *Gubernatori* are only found in the edition of 1662. The last part of the Dedication runs as follows in the edition of 1661: . . . *Mæcenatibus, & Promotoribus ſuis obſequio æternum devinctus obſervationes haſce Anatomicas Offert*

NICOLAUS STENONIS
Auth. & Reſp.

P. 11. l. 2 from top.

D. OTHONI KRAGIO] *Otto Krag* (1611—1666), who belonged to a Danish family of ancient nobility, was at this time the Danish Ambassador to the Netherlands. He was a dauntless and intelligent man. In 1653 he had become a member of the Imperial Council of Denmark, and in the Parliament of 1660, when hereditary absolutism was being introduced in Denmark, he proved a powerful advocate of the rights of his class. See *Dansk biografisk Lexikon*, vol. IX p. 440. *(J. A. Fridericia.)*

P. 11. l. 8 from top.

D. D. JOHANNI JOH. SVANINGIO] *Hans Svane* or *Svaning* (1611—1668), an imperious and ambitious man, at the time of the session of the Parliament in Copenhagen in 1660 Bishop of the Diocese of Zealand, was a staunch promotor of the introduction of absolute government in Denmark. For his zeal in this cause he was rewarded in various ways by the King, *Frederik III, e. g.* by being appointed Archbishop, in which office he has been the first and the only protestant of all the divines, on whom that title has been bestowed, the office never having been filled after his death.

P. 13. l. 7 from top.

a Protogene] *Protogenes* was a Greek painter from the fourth century B. C. He enjoyed a wide-spread reputation, and was especially admired for his scrupulosity as regards the execution of his pictures. On a single painting of his he is said to have been at work for seven (or eleven) years.

P. 14. l. 11 from top.

Dædalea junctarum coagmentatio] Dædalus, a legendary personage of Greece, used to be considered the architect of any ancient building all over that country. He was also supposed to have built the famous Labyrinth at Crete.

P. 14. l. 19 from top.

Apelles] *Apelles* was one of the most renowned painters of the olden time. He was a friend of *Alexander the Great*, whom he painted a great many times; he was, in fact, the only painter, by whom the king permitted his portrait to be made.

IN the edition of 1662 and the reprint of 1680 the following poem is found after the Preface.

IN NOVOS SALIVÆ & LACRYMARUM DUCTUS.

Dum non nota ſtetit tubulorum larga propago
Cæcis membra ſecans gyris, queis roſcida labra
Supra infraque madent, gingivæ, lingua, cibuſque
Gutture demiſſus: queis lumina flumina fiant
Per mæſtas delapſa genas torrentia, quando
Mens trepidat concuſſa metu: queis ſtillat obortô
Læſum Aquilone caput, madidique infantia naſi.
Sudoris, muci, lacrymarum ſpiſſa tegebat
Umbra vias, nulli conſtabat fontis origo,
Qui membra ac vultum ſpumosâ immergeret undâ.
Irrita languentum votiva tabella, nec Artis
Sat fœcundus erat labor, Aſthmate quando calebant
Ora, movente diu ſtomacho faſtidia tuſſi.
Glandula ſpreta [latex nam ſub lare conditur illo,

[1]) Neoburgum] *Dan.* Nyborg. Fionia] *Dan.* Fyn.

Divite qui venâ per totos ſpargitur artus]
Has turbas dedit, & doctos commiſit acerbo
Seſe inter bello, nunc hunc nunc mordicus illum
Uſum aſſignantes, alii nam Tubera fulcra
Vaſorum dixere, locum complere vacantem
Ancipites alii, nec, queis tua pagina ſurgit,
Argumenta valent imos reſerare receſſus,
Candide Varthoni, licet in penetralia miſſus.
Fata obſtant, nomenque tuum, laudeſque perennes,
Optime Stenoni, nam primus nubila tecta,
Tecta umbroſa, angusta petis, primuſque recludis
Oſtia clauſa domus, ſecretaque ditia pandis
Iam nobis, famamque tibi, famamque repertis.
His fortunatus, nec guttis grandibus ora
Humectes unquam, nec, ſi vel Neſtora[1]) vincas,
Pœna ſenum, pituita tuis ſit noxia membris.
Matth. Iacobi Matthiades.[2])

P. 17. l. 1 from top.

cum convicto a *Socrate Ariſtodemo]* *Xenophon, Memorabilia Socratis* (Ἀπομνημονεύματα) I 4, 6 f.

P. 17. l. 1 from bottom.

ἐν πορφύρᾳ πίθηκον venerantes] A proverbial saying concerning bad things and persons, whose folly shows itself, notwithstanding their splendour. See *Paroemiographi Graeci ed. a Leutsch.* Gottingae 1851. II p. 614 (Apostolios XIV 32).

P. 17. l. 1 from bottom.

Silenos *Alcibiadis* tranſeant] *Platon, Convivium* (Συμπόσιον) c. XXXII Φημὶ γὰρ δὴ ὁμοιότατον αὐτὸν εἶναι τοῖς Σειληνοῖς τούτοις τοῖς ἐν τοῖς ἐρμογλυφείοις καθημένοις, οὕστινας ἐργάζονται οἱ δημιουργοὶ σύριγγας ἢ αὐλοὺς ἔχοντας· οἱ διχάδε διοιχθέντες φαίνονται ἔνδοθεν ἀγάλματα ἔχοντες θεῶν.

P. 18. l. 7 from top.

forſan & qvæ non intellexi] *Diogenes Laertius* II 22. *Euripides* asks *Socrates*, what he thinks of a book of *Heraclitus'*; *Socrates* replies: Ἃ μὲν συνῆκα, γενναῖα, οἶμαι δὲ καὶ ἃ μὴ συνῆκα.

P. 18. l. 15 from bottom.

cum ſpongiis communia] See *Hippocrates*, Περὶ Ἀδένων. Ed. Littré. vol. VIII p. 556.

P. 19. l. 15 from bottom.

Gerardum Leonardi Blaſium] The edition of 1661 here and in § 13 [p. 23 in the present Edition] has instead of *Gerardum: Johannem*, which was the name of *Blaes'* younger brother [see note to I p. 4. l. 15 from top]. This mistake, as being indicative of *Steno's* unreliableness, was much dwelt upon by *Blaes* in a long letter to *Thomas Bartholin*, dated Amsterdam July 16, 1661. See *Epist. Medicin. Cent. III.* Hafniæ 1667. Epist. XLIII p. 164. The edition of 1680, which appeared after *Steno's* having given up scientific studies altogether, has once more the wrong name instead of the right one in the same two places.

P. 19. l. 4 from bottom.

tam brevi] These two words are not found in the editions of 1662 and 1680.

P. 20. l. 17 from top.

a Clariſſ. *Whartono* deſcriptas] See *Adenographia . . . Authore Thomâ*

[1]) *Nestor*, King of Pylos, when a very old man, took part in the expedition against Troy.

[2]) *Matthias Jacobæus* (1637—1688) was the son of the Bishop of Aarhus in Jutland (Denmark), *Jacob Matthiesen*, D. D., who was married to a sister of *Thomas Bartholin*. *Matthias Jacobæus* in 1664, having travelled four years abroad, was appointed Professor at the University of Copenhagen, to a chair which had originally been intended for *Steno*. He was a brother of *Jens (Janus) Jacobæus* and of *Steno's* future pupil *Holger (Oligerus) Jacobæus*, both of whom became, too, Professors at the University of Copenhagen.

Whartono. Londini 1656. c. XXI p. 128 and c. XXII p. 137.

P. 20. l. 17—18 from bottom.

qvas *conglomeratas . . . Sylvius* appellat] To the editor's knowledge *Sylvius* spoke of his classification of the glands, into *glandulæ conglobatæ* and *conglomeratæ*, for the first time in a dissertation entitled *De lienis & glandularum usu.* Lugd. Batav. 1660. Immediately below *Steno* quotes from the second edition of this dissertation, which is found as No. V in: . . . *Sylvii . . . Disputationum Medicarum Pars Prima* . . . Amstelodami 1663. *Glandulæ conglobatæ* correspond to those now called the lymphatic glands, *glandulæ conglomeratæ* to the other glands then known: the pancreas, the submaxillary gland, &c.

P. 20. l. 6 from bottom.

exſurgentes] Here follows in *Sylvius: quales* pancreas *exſiſtunt, &* thymus, *&c.*

P. 21. l. 1 from top.

duo genera reperiuntur] *Olof Rudbeck* first discovered the lymphatic vessels, which come from the liver; these he called *ductus hepatici aqvosi.* Later he found other lymphatics, and these he called *vasa glandularum serosa.* See *Nova Excercitatio Anatomica, Exhibens Ductus Hepaticos Aquosos, & Vasa Glandularum Serosa . . . ab Olao Rudbeck.* Aroſiæ 1653.

P. 21. l. 3—4 from top.

contenta . . . deponant] As related in the Introduction, *Steno* considered the ducts of the glands then known *(duct. Wirsungianus, Whartonianus, Stenonianus)* as analogous with the lymphatics of the conglobate (ɔ: lymphatic) glands.

P. 21. l. 16 from top.

Hippocr. Lib. de Gland.] Περὶ Ἀδένων. 4. Ed. Littré. vol. VIII p. 558.

P. 21. l. 16 from bottom.

Zwingerus in tabulis exponit] See *Hippocratis Coi Aſclepiadeæ gentis ſacræ coryphæi Viginti Dvo Commentarii Tabvlis illuſtrati . . . Theod. Zwingeri Bas. ſtudio & conatu.* Basileæ 1579. p. 381.

P. 21. l. 14 from bottom.

acturum ait] Περὶ Ἀδένων. 7. Ed. Littré. vol. VIII p. 560.

P. 21. l. 8 from bottom.

Epidem. I, ſect. 3] *Hippocrates,* Περὶ Ἐπιδημιῶν I 3 passim. See especially Ed. Littré. vol. II p. 660. Here and elsewhere a swelling of τὰ παρὰ τὰ ὦτα in several patients is mentioned.

P. 21. l. 4 from bottom.

Celſus Pliniusqve] Celsi De Medicina Libri VIII, lib. VI. c. XVI. — *C. Plinii Secundi Naturalis Historiæ Libri Triginta Septem.* Several places in the following books: XX, XXII, XXIII. XXIV, XXV, XXVII, XXVIII, XXIX, XXXII, XXXV.

P. 22. l. 4—5 from top.

ſcrofulis affectas] Ed. Lugd. Batav 1680 has: *affecta.*

P. 22. l. 19 from bottom.

pondere expreſſit Dn. *Whartonus] Adenographia,* c. XVIII pp. 119 —120 and c. XX p. 125. ȝiiijſſ = 17.6

grammes, ʒijſſ = 9.8 gr., ʒiij = 11.7 gr., ʒij = 7.8 gr., ʒxj = 340 gr., ʒiiijſſ = 141 gr., ʒiiij = 125 gr.

P. 22. l. 3 from bottom.

qvinti paris ramus durior]ↄ: *Nervus facialis.* See *Thomæ Bartholini Anatomia . . . Reformata.* Lugd. Batav. 1651. Libellus III p. 454: . . . *unde* Galeno alii nervi molles, alii duri . . . *Omnes vero partes motum voluntarium habentes duriores accepere nervos, quia durum ad agendum eſt magis aptum, molle ad patiendum.*

P. 23. l. 9 from top.

Gerar. Leon. Blaſio] See note to p. 19. l. 15 from bottom.

P. 24. l. 3 from top.

Caſſerius ſcribit] See note to p. 3. l. 1 from bottom.

P. 24. l. 4—5 from top.

Præſidem in ſuis ad *Veſalium* commentariis] *A. v. Haller (Bibliotheca Anatomica* I. Tiguri 1774. p. 434) while mentioning the writings of *van Horne,* says with regard to this passage in *Steno: Commentarius in* Vesalium, Stenonio *dictus, undique periiſſe videtur.*

P. 24. l. 13 from top.

qvi ad expreſſionem parum facit] Ed. Lugd. Batav. 1661 has *qvæ* instead of *qvi.*

P. 24. l. 19—20 from top.

in prima . . . diſputatione] *Disqvisitio Anatomica De Dvctibvs Salivalibvs Prima Qvam Svb Praesidio Ioannis van Horne . . . Proponit Iohannes Nvck . . .* Lvgd. Bat. 1656. § V. (In *Dispvtationvm Anatomicarvm Selectarvm Volvmen I Ad Chylificationem Collegit, Edidit, Praefatvs Est Albertvs Haller.* Gottingae 1750.)

P. 25. l. 3 from top.

conglobata glandula] The word *conglobata* is not found in Ed. Lugd. Batav. 1661.

P. 25. l. 4 from top.

Whartonus obſervarit] Ed. Lugd. Batav. 1680 has *obſervavit.*

P. 25. l. 14—15 from top.

glandulæ huic tribuuntur] *Adenographia,* c. XX p. 127.

P. 25. l. 16 from bottom.

ab hoc oriundi] These words are added by *Steno,* or rather, *ab hac oriundi,* as all the editions have it.

P. 27. l. 13—15 from top.

Sed & . . . videntur] These two lines are not found in Ed. Lugd. Batav. 1661.

P. 27. l. 13 from top.

apud *Aqvapendentem]* See *Opera Chirvrgica Hieronymi Fabritii Ab Aqvapendente . . .* Francofvrti 1620. Pars II lib. II c. XXXI *De Vulneribus Genarum.* p. 901 . . . *ſed verſus aurem foraminulum anguſtiſſimum vix oculis conſpicuum, apparet, per quod, potiſſimum vbi patientes madunt, tanta copia exit limpidæ aquæ, quæ eſt veluti lachryma ab oculis emiſſa, & durat aliquando vnum, aliquando duos menſes. Vnde, & quo modo effluat, ego certe neſcio . . .* (The original edition is printed in Paris 1613 [?]).

P. 27. l. 17—18 from bottom.

oſtiis per tunicam hiant] These are the minute ducts, which are now

called *ductus Rivini*. *Rivinus* described them in a corollary to his *Disputatio de dyspepsia*. Lipsiæ 1678. (*Haller, Bibliotheca Anatomica* I p. 649), reprinted in *Augusti Quirini Rivini . . . Dissertationes Medicæ Diversis Temporibus Habitæ . . .* Lipsiæ 1710, p. 425. — The last discovered of the greater ducts of the salivary glands, has first been described by *Caspar Bartholin, Thomæ filius*, in *De Ductu Salivali Hactenus non descripto Observatio Anatomica*. Hafniæ 1684.

P. 27. l. 1 from bottom.

Adenogr. c. 22.] Cap. XXII pp. 142—143. P. 143: *Concludo igitur, ſalivam proprie ſignificare debere, liquorem per ductus ſalivales effuſum; ſputum tuſsi rejectum, excrementum pulmonum; humorem e naribus & ſupra palatum, pituitam cerebri; verum muccum tonſillarum, materiam illam, quæ per tonſillas, de quibus nunc agimus, excernitur.*

P. 28. l. 4 from top.

Schneideri De Catarrhis] *Conradi Victoris Schneideri . . . Liber De Catarrhis Tertius* . . . Wittebergæ 1661. sect. II. c. III. p. 501. P. 503: *Illa membrana, quę* additamentum oſſis Occipitis *in ultimo palato involvit, illa, inquam, pituitam condit, continet & emittit.* — *Schneider* was the first who spoke against the then generally adopted theory that the mucus of the nose, the mouth and the throat had its origin from the brain, from where it passed down through the minute holes in the bones of the skull. *Schneider* maintained that the mucus originated from the *membrana pituitaria anterior* and *posterior* (the mucuous membrane of the nose and the upper part of the throat) and was formed by a sort of exudation from the arteries of the mucuous membranes.

P. 28. l. 7 from top.

foraminulis] Ed. Lugd. Batav. 1680 has *foraminibus*.

P. 31. l. 8 from top.

raram . . . hiſtoriam refert] *Thomæ Bartholini Historiarum Anatomicarum Rariorum Centuria III. & IV.* Hafniæ 1657. Cent. III hist. LXXVII p. 152: *Ptyalismus ſingularis.*

P. 31. l. 16 from top.

non poterunt non] The latter *non* is not found in Edd. Lugd. Batav. 1662 and 1680.

P. 31. l. 10 from bottom.

De Morbis a Seroſ. Coll.] *Selectiorvm Observationvm Et Consiliorvm De Prætervisis Hactenvs Morbis Affectibvsqve Præter naturam ab aquâ, ſeu ſerosâ colluuie & diluuie ortis Liber Singvlaris. Avthore Carolo Pisone.* Ponte Ad Monticvlvm 1618. sect. I theor. 4. pp. 34—35. — P. 35: *Quæ ſi vera ſunt, vt ſunt veriſſima, certè concludere eſt caput eſſe veluti labrum ſeu caſtellum natum diſtributioni aquæ in varia membra eius vſus indiga.*

P. 31. l. 8 from bottom.

ſect. 2. part. 1. c. 2.] *ibid.* pp. 39—41.

P. 32. l. 7 from top.

A *cerebro* alii] As to the theories most current at the time of *Steno* concerning the genesis of the saliva and other secretions, the reader is referred, in addition to the notes to vol. I p. 28. l. 4 from top, to *Wharton's Adenographia*, partly to the introduction, partly to

chapters XXI and XXII, especially pp. 136 and 144.

P. 32. l. 8 from top.

Nobil. *Bilſius]* In a pamphlet printed in Dutch in 1658, but soon translated into Latin under the title *Di Ludovici De Bils Toparchæ in Koppenſdamme, Bonem, &c. Epistolica Dissertatio: Qua verus Hepatis circa Chylum, & pariter ductus Chiliferi hactenus dicti uſus, docetur*[1]) *Bils* had maintained that the view adopted on the basis of the discoveries made by *Pecquet*, *van Horne* and *Th. Bartholin* concerning the function of the chyle and the thoracic duct, was erroneous. *Bils* asserted that the chyle was conveyed to the liver by the *venæ mesaraicæ* mixed with blood and that the thoracic duct, which he called *ductus roriferus*, only carried lymph, which was led from there direct all over the body in small canals, to appear as tears, saliva etc.

P. 32. l. 9 from top.

Anton. Deuſingius] *Deusing*, who had never made any anatomical investigations himself but was a man of extensive reading, sided with *Bils* in the long and troublesome quarrel, which arose through *Bil's* pamphlet mentioned above; a quarrel in which *Bartholin* joined with ardour and in which *Steno*, too, was involved for a time. In his *Exercitationes Phyſico-Anatomicæ, De Nutrimenti in Corpore Elaboratione. Vbi De Chylificatione, & Chyli Motu; Sanguificatione; Depuratione Alimenti; Itemque Spiritibus. Quibus adjecta appendix in qua examini ac judicio aliorum ſubjiciuntur variæ de chyli motu et nutrimenti in corpore elaboratione nec non de admiranda anatome nobiliss. viri D. Ludovici de Bils.* Groningæ 1660, *Deusing* asserted, that the saliva had various sources. The greater part of the saliva was, according to him, the watery fluid which came from the larger salivary glands through their excretory ducts, and which was first conveyed to the glands from the *ductus roriferus* through certain *ramuli roriferi;* but moreover the saliva consisted of the more watery part of the serum, which through small arteries was exuded into the mouth; and lastly of a watery matter which passed from the brain through the *foramina* in the sphenoid bone to the glands mentioned above or direct into the mouth. — *Steno's* reference to *Deusing* here, and again in § 42. (vol. I p. 42 of the present Edition) called forth a pamphlet from *Deusing: Vindiciæ hepatis redivivi*, 1661, to which *Steno* replied with his Treatise *Responsio Ad Vindicias Hepatis Redivivi* in *Observationes Anatomicæ* . . . 1662 (No. IV of the present Edition. vol. I p. 61. See the introduction to the notes to it.).

P. 32. l. 13 from bottom.

μήτε ἀπομύττεσθαι] *Xenophon, Institutio Cyri* (Κύρου παιδεία) I 2, 16: Αἰσχρὸν μὲν γὰρ ἔτι καὶ νῦν ἐστι Πέρσαις καὶ τὸ ἀποπτύειν καὶ τὸ ἀπομύττεσθαι, καὶ τὸ φύσης μεστοὺς φαίνεσθαι.

P. 32. l. 10 from bottom.

ἐστι κρίσις] *Hippocrates, De Diæta* (Περὶ Διαίτης) III 70. Ed. Littré. vol. VI p. 608.

[1]) This pamphlet is found (pp. 20–23) in: *Epistola Apologetica Ad Magnum Th. Bartholinum Regium in Regiâ Hafnienſi Profeſſorem Anatomicorum Coryphæum De Calumniis Nobiliſſ. Ludovico Bilsio à Coppenſdamme, Bonem, &c. D° . . . impactis . . .* Roterodami 1661.

P. 33. l. 7 from bottom.

Spiritus aqvæ & oleo jungi poterit] On several chemical terms mentioned in the sequel and elsewhere in *Steno's* writings, information is to be found in *Totius Medicinæ Idea Nova, Seu Francisci Silvii De Le Boe . . . Opera Omnia . . . Acceſſere Chymia . . .* Parisiis 1671:

Lib. II p. 287. 11. *Spiritus à volatilitatis ſimilitudine, quam cum Mercurio habet, dictus Mercurius vocatur vulgò Chymicis quicumque liquor activus penetrans purgativus ut ſpiritus vini rectificatus, ſpiritus ſalis nitri; ſpecialiter tamen ſpiritum vocant illum qui ex rebus fermentatis paratur, ut eſt ſpiritus abſynthij, roſarum, cardui benedicti; maximè tamen propriè ſpiritus appellari debet, quidquid eſt ſummè volatile in rebus, adeo ut ejus notio in rebus ſolâ volatilitate conſiſtat; atque hoc modo reperitur triplex ſpiritus, inſipidus, ſulphureus & ſalinus.*

P. 287. 12. *Sulphur vocatur quidquid eſt inflammabile . . .*

P. 287. 13. *Sal dicitur quidquid poteſt incinerari & eſt acre, eſtque duplex fixum & volatile; utrumque reſpectu ignis ſic dicitur.*

P. 290. 13. *Menſtruum Chymicis dicitur liquor habens vim corpus aliquod ſolvendi, ſic dictum, quia plerumque per menſem Chymicum, id eſt 40. dies cum corpore ſolvendo in digeſtione ponitur, quo tempore corporis fit ſolutio . . .*

P. 303. 23. *Spiritus nitri.* p. 307. 32. *Butyrum antimonij.* p. 308. 35. *Bezoardicum minerale.* p. 312. 45. *Oleum tartari per deliquium.* p. 324. 56. *Aqua fortis.*

P. 34. l. 10—11 from top.

Mercurii mobilitas . . . impedita] This may refer to *Basilius Valentinus's* having discovered that *spiritus vitrioli* (sulphurous acid) discharged *mercurium* from a solution of perchloride of mercury, or to the current belief that mercury ſolidified when poured into boiling linseed oil.

P. 34. l. 18 from top.

parum ſpiritus volatilis, & minimum ſalis lixivioſi] De Lienis & Glandularum Usu (dated March 13, 1660) is found as Disp. V in *Disputationum Medicarum Pars Prima.* Amstelodami 1663. See p. 72. — *Spiritus volatilis* = volatile matter. *Sal lixiviosum* = alkaline salt. See the note above to p. 33. l. 7 from bottom.

P. 35. l. 5—6 from top.

hanc πανσπερμίαν] A conception which is frequently mentioned by *Aristotle.* See, for instance, *De Generatione Animalium* (Περὶ Ζώων γενέσεως) lib. VI c. 3: . . . εἰσὶ γάρ τινες οἳ φασι τὴν γονὴν, μίαν οὖσαν, οἷον πανσπερμίαν εἶναί τινα πολλῶν.

P. 35. l. 11—12 from top.

negans argumentatio] The editions Lugd. Batav. 1662 and 1680 have *negativa.*

P. 35. l. 17—18 from bottom.

D. *Olao Borrichio]* *Ole Borch* (1626—1690), son of a clergyman, was born in Nørre-Bork in Jutland (Denmark). In 1644 he entered the University of Copenhagen, going in for the study of Anatomy, Botany, Chemistry, Philosophy, Philology and Poetry. From 1650 he was an usher in *Vor Frue Skole* (Our Lady's School), where he was *Steno's* teacher; and from 1655 and five

years onward, as well as later, he was the tutor of the sons of *Joachim Gersdorf*, the Lord High Steward of Denmark. He distinguished himself when taking part in the defence of Copenhagen in 1659, and immediately after he was appointed Professor of Philology, Botany and Chemistry. He went abroad for six years, visited Holland, where *Steno* met him, England and France, became Doctor in Angers in 1664, and was then afterwards in Florence and Rome. Having returned to Denmark in 1666 he became *Medicus Regius* and founded the *Collegium Medicæum* (generally called *Borchs Kollegium*) for sixteen undergraduates. — *Ole Borch* was a most capable and learned man, who enjoyed a great reputation among his contemporaries, especially, perhaps, for his works on philology and poetry; but his studies in chemistry are of great merit, too. Besides numerous chemical treatises in *Acta Hafniensia Ole Borch* composed two books on the history of chemistry: *De Ortu, Et Progressu Chemiæ Dissertatio*, Hafniæ 1668 and *Hermetis, Ægyptiorum, Et Chemicorum Sapientia* ... Hafniæ 1674, and one on practical chemistry: *Docimastice Metallica*. Hafniæ 1677. In medical science, too, *Ole Borch* was a man of great ability. See *Dansk biografisk Lexikon*, vol. II p. 500 *(H. F. Rørdam, M. Cl. Gertz, S. M. Jørgensen, Jul. Petersen.)*.

P. 35 l. 6—7 from bottom.

qvi σύγκρισιν rerum & διάκρισιν admittunt] Σύγκρισις and διάκρισις (composition and separation) are the technical terms for the explanation of the coming into being and the passing away which was given by *Democritus* (the Atomists) and *Anaxagoras*. In the ancient philosophy the colours are generally explained to be mixtures of the primary colours *(Aristotle* and his School).

P. 36. l. 1 from top.

bezoardicum minerale] *Bezoardicum minerale* means the precipitate obtained by the adding of nitric acid *(spiritus nitri)* to trichloride of antimony *(butyrum antimonii)*.

P. 36. l. 7 from top.

de *Benneti* experimento] See *Theatri Tabidorum Vestibulum ... Per Christoph: Bennettum*. Londini 1654. c. III pp. 10—15.

P. 36. l. 7—8 from top.

qvod *Pecqvetus* in ſero obſervavit] See *Ioannis Pecqveti ... Experimenta Nova Anatomica ... Eivsdem Dissertatio Anatomica De Circvlatione Sangvinis, Et Chyli Motu*. Parisiis 1651. c. II p. 5.

P. 36. l. 18—19 from top.

niſi *Democritus* forte aliqvis] About the capability of the famous Greek philosopher *Democritus* (born in 460 B. C.) of seeing through everything all that was concealed from other people, many legends are found in ancient history; his fame increased through the Middle Ages when he was looked upon nearly as a sorcerer.

P. 36. l. 19—20 from top.

lac virginis] By *lac virginis Steno* most likely meant *tincture of Benzoes (Boerhave)*. In *Libavius lac virginis* is an opalescent solution of sugar of lead.

P. 36. l. 19 from bottom.

lac tithymallorum, lac cichoreaceorum] The juice of certain plants belonging to the *euphorbiaceæ* and *compositæ*.

P. 37. l. 10 from top.

de ſucco benigno & chylo propinqviore] See *Novus Et Genuinus Hominis Brutique Animalis Exortus. Authore Anthonio Everardi.* Mediobvrgi 1661. p. 18.

P. 38. l. 18—19 from top.

Spicileg. de Vaſ. Lymphat. I. c. 7.] *Thomæ Bartholini . . . Spicilegium Ex Vasis Lymphaticis . . .* Hafniæ 1655. c. VII p. [4].

P. 38. l. 17 from bottom.

De Circulat. Sangv. & Chyl. Mot. c. 5.] See *Dissertatio Anatomica De Circvlatione Sangvinis, Et Chyli Motv*, c. V p. 40. This treatise constitutes the latter part of *Experimenta Nova Anatomica . . .* Parisiis 1651.

P. 39. l. 12 from bottom.

ex Cl. *Sylvii* ſententia] See *Disputationum Medicarum Pars Prima.* Amstelodami 1663. Disp. V p. 66.

P. 39. l. 7 from bottom.

De Nat. Deor.] Cicero, *De Natura Deorum*, I 1, 1.

P. 41. l. 9 from top.

qvod & Cl. *Whartonus* obſervaſſe videtur] *Adenographia*, c. XXI pp. 130—131. See also the present Edition vol. I p. 188. III.

P. 41. l. 19 from bottom.

Hunc enim ad locum] Hence to . . . *ſtylo conceſſerit* p. 42. l. 11 from top is not found in Ed. Lugd. Batav. 1661.

P. 43. l. 18 from top.

Et hic ille chyli motus] This passage runs as follows in Ed. Lugd. Batav. 1661: *Et hic ille chyli motus, quem ſibi demonſtrari in ſpicilegio ſecundo D.* Bartholinus *cupit.*

P. 43. l. 19 from top.

in *Spicilegio Secundo*] See *Th. Bartholini Spicilegium Secundum Ex Vaſis Lymphaticis.* Hafniæ 1660. c. VII *Ludovici de Bils nova experimenta ventilantur.* p. 33.

P. 43. l. 19—20 from top.

in *Reſponſione*] *Th. Bartholini Responsio De Experimentis Anatomicis Bilſianis Et Difficili Hepatis reſurrectione.* Hafniæ 1661.

P. 43. l. 18 from bottom.

in *Epiſtolica Diſſertatione*] See note to vol. I p. 32. l. 8 from top.

P. 43. l. 17 from bottom.

voluit demonſtrare] See Letter from *Ole Borch* to *Th. Bartholin*, dated Leyden March 3, 1661, in *Epist. Medicin. Cent. III.* Hafniæ 1667. Epist. LXXXV p. 364.

P. 44. l. 5—6 from top.

illum dignoſcere potuerint] See Letter from *Ole Borch* to *Th. Bartholin*, dated Leyden March 31, 1661, in *Epist. Medicin. Cent. III.* Hafniæ 1661. Epist. LXXXIX p. 382.

P. 44. l. 7 from bottom.

§ 45] There is no section bearing the

No. 45 in any of the editions. This, as well as other mistakes in the numbering of the sections, has been corrected in the present Edition; so from this place onward the numbers of the sections do not correspond to those of previous editions.

P. 44. l. 5 from bottom.

Henrico a Móinichen] Henrik a Móinichen (1631—1709), graduated in Copenhagen in 1650 and studied abroad for some time, especially anatomy. He was patronized by *Th. Bartholin*, and after his return he was offered the chair as Professor of Anatomy at the University of Copenhagen. He rejected this offer, however, and was appointed Physician of the Royal Household. See *Dansk biografisk Lexikon*, vol. XII p. 39 *(G. L. Wad)*.

P. 45. l. 3 from bottom.

colore adhuc tincto] *adhuc* is not found in Edd. Lugd. Batav. 1662 and 1680.

P. 46. l. 8 from top.

lympha etiamnum tumerent] *etiamnum* is not found in Edd. Lugd. Batav. 1662 and 1680.

P. 46. l. 9—10 from bottom.

propelleretur lympha] *lympha* is not found in Ed. Lugd. Batav. 1661.

P. 46. l. 6—7 from bottom.

Antonius Everhardus] Anthony Everaerts was a physician in Middelburg in Holland. See *Biogr. Woordenboek der Nederlanden*, vol. V p. 243. As to the title of the book quoted see note to vol. I p. 37. l. 10 from top.

P. 47. l. 2 from top.

ad mammas lactis] These words are not found in Ed. Lugd. Batav. 1661.

P. 47. l. 8 from bottom.

niſi forte] Hence to . . . *eſſent concipiendæ* l. 6 from bottom is not found in Ed. Lugd. Batav. 1661.

P. 47. l. 3 from bottom.

facta partim vidi] The word *partim* is not found in Edd. Lugd. Batav. 1662 and 1680.

P. 48. l. 5 from top.

§ 51] Section 51 is not found in Ed. Lugd. Batav. 1661, but is added in Ed. Lugd. Batav. 1662 as § 52.

P. 48. l. 11 from top.

Pag. enim 282] In *Novus Et Genuinus Hominis Brutique Animalis Exortus*. Mediobvrgi 1661.

P. 49. l. 19 from bottom.

ut theſ. 47. expoſui] *i. e.* § 47. in the present Edition.

P. 49. l. 13 from bottom.

inde] Ed. Lugd. Batav. 1661 has *unde*.

P. 50. l. 1 from top.

COROLLARIA] This Corollary appears only in Ed. Lugd. Batav. 1661.

P. 50. l. 5—6 from bottom.

qvæ Clar. Schneiderus . . . *proponit]* See note to vol. I p. 28. l. 4 from top.

III

VARIÆ IN OCULIS & NASO OBSERVATIONES NOVÆ &C.

This Letter from *Steno* to *Thomas Bartholin*, dated Leyden September 12, 1661, is found in *Thomæ Bartholini Epist. Medicin. Cent. III.* Hafniæ 1667. Epist. LVII p. 224.

P. 55. l. 3 from top.

itineri debetur] *Steno* had been on an excursion in Holland from July 27 to August 14, 1661, in the company of *Ole Borch* (see Introduction and note to vol. I p. 35. l. 17—18 from bottom), *Jørgen Hasebard* (see the following note) and a couple of foreign students. On this trip he made the acquaintance, amongst others, of *Peder Schumacher* (see Introduction and *Dansk biografisk Lexikon*, vol. XV p. 371) and of *Borri* who is mentioned below.

P. 55. l. 6 from top.

reduximus *Haſebardum]* *Jørgen Hasebard*, the son of the Bishop of Viborg (Denmark), *Wichman Hasebard*, matriculated at the University of Leyden, September 14, 1661, and was styled *pol. et hist. stud.* He died in 1670 as *Professor Designatus* of Odense Gymnasium (Denmark).

P. 55. l. 6—7 from top.

Walgeſteinium . . . offendimus] *Thomas Rasmussen Walgensten*, born on the isle of Gothland, studied mathematics at the University of Copenhagen and was for many years, until his death, the editor of an almanac. He is found to have matriculated twice at the University of Leyden (1657 and 1669), so it was during his first stay in Holland that *Steno* made his acquaintance. In 1670 he became Inspector of the King's Model Chamber in Copenhagen, being at the same time entrusted with the superintendence of the erection of public buildings in that city. Among other works he took part in the equipment of the Large Room in The Great Royal Library. He died in 1682 as Commissioner and Provincial Judge on Gothland during the Danish occupation of that island. See *Dansk biografisk Lexikon*, vol. XVIII p. 218 *(G. L. Wad)*.

P. 55. l. 10 from top.

Burrhi auxilio] *Gioseppe Francesco Borri* (1625—1695), a native of Milan where his father, himself a member of a renowned family, practiced medicine. He was educated at the College of Jesuits in Rome, and afterwards entered the service of the Papal Court; but when, an enthusiast and a mystic, he endeavoured to establish a sect of his own, he had to leave Rome for Milan to escape the Inquisition (1655). However he kept on working to found a new church and a new state, the supreme head of which he was to be, so at last an action was brought against him in Rome, and he was burned *in effigie*. Already during the law-suit he had fled to Holland (1659) and for several years lived in Amsterdam, where he studied chemistry and alchemy, enjoying a great reputation as a physician. In Holland he made the acquaintance of many prominent Danes, among others of *Ulrik Frederik Gyldenløve* and *Hannibal Sehested*, and through them he may have heard about the interest taken by the King of Denmark, *Frederik III*, in the science of alchemy. At any rate he went to Copenhagen in 1667, where he stayed

for three years till the death of *Frederik III*, and was highly esteemed, both as an alchemist and as a physician. In 1670 he set out for Constantinople, but, while on his way, he was captured and conducted to Vienna, where he was surrendered at the request of the Papal Nuncio. The action against him was renewed, and in 1672 he was sentenced to be imprisoned for life. He died in 1695 in the prison of the Castle of Saint Angelo in Rome. See *Biographie Universelle*, vol. V p. 96 and *Dansk biografisk Lexikon*, vol. II p. 543. *(Chr. Bruun).*

P. 55. l. 11 from top.

Vindicias illius] See note to vol. I p. 32. l. 9 from top, and the introduction to the notes to IV in the present Edition.

P. 55. l. 11 from bottom.

eum *Bilſio* favere] On *Bils* see Introduction. *Steno* here refers to what he has written about *Deusing's* position toward *Bils'* doctrine in his *Disputatio Anatomica De Glandulis Oris* ... Lugd. Batav. 1661, theses 25 and 42 (vol. I p. 32 and 42 of the present Edition). With regard to this matter as well as to the remainder of the Letter, see also *Steno's* reply to *Deusing: Responsio ad Vindicias Hepatis Redivivi* (vol. I p. 61 in the present Edition).

P. 55. l. 3 from bottom.

occaſionem *Exſeqviarum Hepatis] Thomæ Bartholini Vasa Lymphatica, Nuper Hafniæ in Animantibus inventa, Et Hepatis exſeqviæ.* Hafniæ 1653.

P. 55. l. 2 from bottom.

Spicilegium tuum] *Thomæ Bartholini* ... *Spicilegium Ex Vasis Lymphaticis* ... Hafniæ 1655.

P. 56. l. 1 from top.

in *Spicilegio Secundo] Th. Bartholini Spicilegium Secundum Ex Vaſis Lymphaticis* ... Hafniæ 1660.

P. 56. l. 2–3 from top.

in hoc cardine ... verſari ais] See *Th. Bartholini Spicilegium Secundum*, c. VII p. 37: *In hoc cardine ſalus obſervationum noſtrarum volvitur.*

P. 56. l. 6–7 from top.

in *Epiſtolica Diſſertatione]* See note to vol. I p. 32 l. 8 from top.

P. 56. l. 12 from top.

habebis] *Steno* sent his *Observationes Anatomicæ* ... Lugd. Batav. 1662 to *Th. Bartholin* with a letter dated Leyden January 9, 1662, new style. It is found in *Thomæ Bartholini Epist. Medicin. Cent. III.* Hafniæ 1667. p. 262 as Epist. LXV and appears as No. VII in the present Edition (vol. I p. 101).

P. 56. l. 19 from bottom.

a Clariſſ. *Borrichio* ... ſignificatam exiſtimem] See Letter from *Ole Borch* to *Thomas Bartholin* in *Epist. Medicin. Cent. III.* Epist. XCIII p. 401.

P. 56. l. 18 from bottom.

cum *Tractatu de Glandulis Oculorum] Steno's De Glandulis Oculorum* ... dated Leyden December 6, 1661, is the third Treatise in his *Observationes Anatomicæ* ... Lugd. Batav. 1662, and it appears as No. V in the present Edition (vol. I p. 79).

P. 57. l. 7–8 from top.

illam ... diverſitatem non inveni]

This refers to *Bils' Epistolica Dissertatio*, where *Bils* gives a description of his method. See, moreover, *Steno's Responsio Ad Vindicias Hepatis Redivivi* (IV vol. I p. 64 in the present Edition).

P. 57. l. 18—19 from top.

ductum . . . continuum eſſe] See Letter from *Steno* to *Th. Bartholin* in *Epist. Medicin. Cent. III.* Hafniæ 1667. Epist. LXV p. 264 (VII vol. I p. 102).

P. 57. l. 5 from bottom.

ſit feriaturus] *Bils* never replied to *Steno's* criticism.

P. 58. l. 1 from top.

Clariſſ. *Golius]* *Jacobus Golius* (1596—1667), who was born at the Hague, came of an ancient and renowned family. He studied at the University of Leyden till his twentieth year, when he went to live in the country. After some time he left for France, living for a while at La Rochelle; but he returned to the Netherlands on account of the Religious Wars. *Golius* was an eminent man of learning, with great knowledge of various branches of science, having applied himself to the study of the classical languages, philosophy, theology, medicine and mathematics; besides he was a good Arabian and Persian scholar, having learned those two languages during a long stay in Morocco and in the Levant, where he likewise obtained many very valuable manuscripts. In 1629 he became Professor of Mathematics in Leyden. *Golius* was the author of several works of great importance, the best known of which are possibly his Arabian-Latin and his Persian-Latin Dictionaries (*Biogr. Woordenboek der Nederlanden*, vol. VII p. 270 and *Biographie Universelle*, vol. XVII p. 117.).

P. 58. l. 8 from top.

Anno 1661] *Epist. Medicin. Cent. III.* has erroneously 1666.

IV

RESPONSIO AD VINDICIAS HEPATIS REDIVIVI.

This Treatise, dated November 28-18, 1661, appeared in the following year as the second of the four treatises in *Nicolai Stenonis Observationes Anatomicæ* . . . Lugd. Batav. 1662. It is a reply to *Deusing's Vindiciæ Hepatis Redivivi*, directed against *van Horne*, whom *Deusing* took to be the real author of *Steno's Disputatio Anatomica De Glandulis Oris* . . . Lugd. Batav. 1661. See the Introduction and the two previous Treatises (II and III, vol. I p. 17 and p. 55 of the present Edition). — The Editor has not been able to find any copy of *Deusing's Vindicæ Hepatis Redivivi.*

P. 62. l. 18 from bottom.

furtivis coloribus ſplendere] *Horatius, Epistolæ* I 3, 19—20:

> — — — *moveat cornicula risum*
> *furtivis nudata coloribus.*

Edd. Lugd. Batav. 1662 and 1680 have both *furtivus* for *furtivis.*

P. 62. l. 14—15 from bottom.

Chriſtiani Rudnicii] *Christian Rudnick* from Bütow in Further Pomerania is mentioned in *Haller, Bibliotheca Anatomica* vol. I p. 604, where he is called *Practicus Gedanensis (i. e.* from Dantzic), and is put down as the author of a treatise *Cœcum inteſtinum vulpis & leporis*, printed in *Acta Acad. Nat. Curios.*

P. 63. l. 11—12 from top.

Bilſianam . . . opinionem] See In-

troduction and the two previous Treatises (II and III of the present Edition) *passim*.

P. 63. l. 18 from top.

nec ulla] Ed. Lugd. Batav. 1680 has *nulla*.

P. 63. l. 13 from bottom.

poſſis] Ed. Lugd. Batav. 1680 has *poſſit*.

P. 64. l. 6 from top.

Experiment.1.] Ed. Lugd. Batav. 1662 has *expiment. 1.* — The experiment spoken of in *Ioannis Pecqveti . . . Experimenta Nova Anatomica* . . . Parisiis 1651, p. 50 is as follows: A collapsed, tied-up bladder, being under great pressure, will expand and swell, as soon as the pressure is diminished. The experiment is referred to here only as an example of something surprising, something not to be expected beforehand.

P. 64. l. 8 from top.

Præception.] Hippocrates, Præceptiones (Παραγγελίαι) 1—2. Ed. Littré. vol. IX p. 252.

P. 64. l. 11—12 from top.

Bilſii . . . experimento] See *Steno's Disputatio Anatomica De Glandulis Oris . . . passim*, especially thesis 42 (vol. I p. 42 in the present Edition); furthermore, *Ole Borch's* Letter to *Th. Bartholin* in *Epist. Medicin. Cent. III.* Hafniæ 1667. Epist. LXXXV p. 364 and *Bils' Epistolica Dissertatio* (see note to vol. I p. 32. l. 8 from top).

P. 64. l. 18 from top.

obſervavi præſcriptam a *Bilſio* methodum] See note to vol. I p. 32. l. 8 from top and p. 57. l. 7—8 from top.

P. 65. l. 9—10 from top.

Barthol., . . . aggreſſus eſt?] See *Ludovici De Bils . . . ad Th. Bartholinum Regium Hafniæ Profeſſorem Epistola* (dated Rotterdam April 10, 1661). This pamphlet forms pp. 33—39 ot *Ludovici De Bils . . . Responsio Ad Admonitiones Di Johannis ab Horne* . . . Roterodami 1661.

P. 67. l. 1 from top.

dicere] See *Th. Bartholini Spicilegium Secundum Ex Vaſis Lymphaticis* . . . Hafniæ 1660, p. 40.

P. 67. l. 16 from top.

occaſionem *Exſeqviarum Hepatis]* See note to vol. I p. 55. l. 3 from bottom.

P. 68. l. 3—4 from top.

humorem præparare] See *Nicolai Stenonis Disputatio Anatomica De Glandulis Oris . . . Secunda.* Lugd. Batav. 1661. thes. 22. (vol. I p. 31 in the present Edition).

P. 68. l. 6 from bottom.

Zaſſii ſenſum] *Zassius*, a physician of Rotterdam, repeatedly came forward as the defender of *Bils;* see, for instance, *Epistola Apologetica Ad Magnum Th. Bartholinum . . .* Roterodami 1661, in which pp. 3—11 were written by *Zassius* (see note to vol. I p. 32. l. 8 from top).

P. 69. l. 5 from top.

ita loqvitur] *De Bils . . . Epistolica Dissertatio . . .* p. 22. See note to vol. I p. 32. l. 8 from top.

P. 69. l. 7 from top.

ubiqve influit] *Bils* has *ibiqve.*

P. 69. l. 11 from bottom.

Clariſſ. *Schneid.* tom. 3] *Conradi Victoris Schneideri . . . Liber De Catarrhis Tertius . . .* Wittebergæ 1661. P. 554 *Schneider* enumerates all the places, in which he has found *pituita* to be secreted: 1) Membrana pituitaria anterior, *quæ interiora narium & interſtitium earum diverſimodè involvit,* 2) Membrana pituitaria poſterior, 3) Tonſillæ, 4) Ductus Salivales, & illi Sublingvales, 5) Lingua, *ejusq; vaſa,* 6) Larynx & Epiglottis. 7) Summa Gula & Gurgulio.

P. 70. l. 11—12 from top.

de Tabaci Fumo] *Tabacologia: Hoc est, Tabaci, Seu Nicotianæ deſcriptio Medico-Cheirurgico-Pharmaceutica . . . . Per Iohannem Neandrvm . . .* Lvgdvni Batavorvm 1622. This book contains (pp. 228—240) a letter written by *Adrianus Falcoburgius (van Valckenburg)* (1581—1650), Professor of Leyden and an able teacher, especially interested in pathological anatomy *(Biogr. Woordenboek der Nederlanden,* vol. VI p. 36).

P. 70. l. 9—10 from bottom.

loqvitur] Edd. Lugd. Batav. 1662 and 1680 have here *loqvi eum* instead of *loqvitur.*

P. 71. l. 5—6 from top.

de Experimentis Anatomicis Bilſianis] *Th. Bartholini Responsio De Experimentis Anatomicis Bilſianis Et Difficili Hepatis reſurrectione, Ad Clariſſimum Virum Nicolaum Zas.* Hafniæ 1661.

P. 71. l. 9 from top.

Spicileg. 2.] *Th. Bartholini Spicilegium Secundum Ex Vaſis Lymphaticis . . .* Hafniæ 1660. c. VII p. 33. Here and in the remainder of the treatise *Steno* quotes from the reprint of the following year: *Thomæ Bartholini Spicilegia Bina Ex Vaſis Lymphaticis . . .* Amstelædami 1661.

P. 71. l. 11 from top.

in fine tractatus] *ibid.* p. 47 in Ed. Hafniæ 1660, and pp. 116—117 in Ed. Amstel. 1661.

P. 71. l. 14 from top.

repugnarim] Both editions of *Spicilegium Secundum* (Hafniæ 1660 and Amstelædami 1661) have *repugnarim,* but *Steno* has *repugnarem.*

P. 71. l. 18 from top.

In *Reſponſ.* autem p. 10] *Th. Bartholini Responsio De Experimentis Anatomicis Bilſianis . . .* Hafniæ 1661. *Steno* quotes from an edition, published the same year in Amsterdam; and *p. 10* corresponds to p. 15 of Ed. Hafniæ 1661.

P. 71. l. 9 from bottom.

omnibus notum] *Gasparo Aselli* found *vasa lactea* in 1622. His discovery was published in the year after his death: *De lactibus s. lacteis venis quarto vasorum mesaraicorum genere, novo invento dissertatio . . .* Mediolan. 1627. (quoted from *Haller, Bibliotheca Anatomica,* vol. I p. 362). The tract on *Aselli's* discovery exists in several editions, and is also reprinted in *Le Clerc & Mangetus, Bibliotheca Anatomica,* Genevæ 1685 and 1699.

P. 72. l. 2 from top.

in *Epiſtolica Diſſertatione]* See note to vol. I p. 69. l. 5 from top.

P. 72. l. 4 from top.

ſe vias] *Bilſius* has *vias ſe.*

P. 72. l. 19 from top.

c. 8. *Vaſ. Lymphat.] Thomæ Bartholini Vasa Lymphatica, Nuper Hafniæ in Animantibus inventa, Et Hepatis exſeqviæ.* Hafniæ 1653. c. 8. p. 55—56. *Steno* has, erroneously, c. 7.

P. 72. l. 14 from bottom.

in animalibus] Bartholin has *in animantibus.*

P. 72. l. 11—12 from bottom.

Vidimus . . . eſſe ſui generis] The word *illa* is not found in *Steno. Bartholin* has *ſui eſſe* instead of *eſſe ſui.*

P. 72. l. 10—11 from bottom.

Lymphatica *nobis dicta]* The designation *vasa lymphatica* is due to *Bartholin (Vasa Lymphatica, Nuper Hafniæ in Animantibus inventa* . . . Hafniæ 1653). See, also, note to vol. I p. 21. l. 1 from top.

P. 73. l. 8 from top.

Spicileg. p. 104] See note to vol. I p. 71. l. 9 from top. Page 104. of Ed. Amstelædami 1661 corresponds to p. 37. of Ed. Hafniæ 1660.

V

DE GLANDULIS OCULORUM NOVISQVE EARUNDEM VASIS OBSERVATIONES ANATOMICÆ.

This Treatise, which is dated Leyden December 6, 1661, appeared in the following year, as the third of the four treatises in *Nicolai Stenonis Observationes Anatomicæ* . . . Lugd. Batav. 1662. See, moreover, Treatise III of the present Edition.

P. 77. l. 2 from top.

D. SIMONI PAULLI] *Simon Paulli* (1603—1680), who was born at Rostock in Mecklenburg, came to Denmark when only one year of age, his father being appointed Physician in Ordinary to the Queen Dowager *Sophie.* After having studied at Rostock and Leyden, as well as in Belgium and England *Paulli* returned to Denmark in 1626, where he worked at botany and mathematics, the latter under *Thomas Fincke* of Copenhagen. Then he went abroad for a second time, among other places visiting Paris, where he obtained favour with *Riolan.* In 1630 he was made a Doctor at Wittenberg, and two years later he became Professor of Medicine at Rostock. In 1639 he was called to Denmark, where he was appointed *Professor Extraordinarius* of Anatomy, Surgery and Botany at the University of Copenhagen. In 1645 he inaugurated the first Danish *Theatrum Anatomicum,* being the first Professor of Anatomy in his adopted country. However, he was not much interested in this branch of science, and in 1648 he resigned his professorship to *Thomas Bartholin,* in order to devote himself to the study of botany which he cultivated in several ways, for instance by making botanical excursions with his students. In 1650 *Paulli* became Physician to the Royal Household; in 1656 he was appointed Physician in Ordinary to the King; besides he obtained a Canonicate and later on a Prelature in Aarhus in Jutland (Denmark). His most important contribution to literature is his work *Flora Danica* (1648). See *Dansk biografisk Lexikon,*

vol. XII p. 567. *(Jul. Petersen, E. Rostrup).*

P. 77. l. 5 from top.

D. GEORGIO HILARIO] *Jørgen Eilersen, Georgius Hilarius* (1616–1686) was born at Vordingborg in Denmark and from 1635 to 1638 studied at the University of Copenhagen, where he graduated in theology. After that he went abroad for some time, returned and lived as a vicar in the country till 1641, when he was appointed assistant master at *Vor Frue Skole* (Our Lady's School) in Copenhagen, graduating in the same year as Master of Arts. In 1654 he was appointed Titular Professor at the University, and in 1672 he became *Professor Ordinarius* of Mathematics. He had been *Steno's* teacher, when the latter went to school at Our Lady's. See *Dansk biografisk Lexikon*, vol. IV p. 464 *(S. M. Gjellerup).*

P. 79. l. 10 from top.

Stevinus] *Simon Stevin* (1548–1620) an eminent mathematician and mechanician, who contributed largely to the foundation of the science of statics. *(Biogr. Woordenboek der Nederlanden*, vol. XVII 2. p. 1003 and *Biographie Universelle*, vol. LI p. 237.) In *Les Œuvres Mathematiques De Simon Stevin de Bruges . . . Par Albert Girard.* A Leyde 1634. *I Livre de la Geographie.* p. 110 *Stevinus*, in continuance of and relative to a long Letter written by *Hugo Grotius*, discourses on the praise of previous scientific contributions, contained in the works of certain classical authors.

P. 79. l. 23 from top.

Crifpini *famam]* See *Horatius, Sermones*, I 1, 120.

ne me Crispini scrinia lippi
compilasse putes.

Porphyrius says in his commentary: Plotius Crispinus *philosophiæ studiosus fuit. Idem et carmina scripsit, sed tam garrula, ut aretalogus diceretur.*

P. 79. l. 24 from top.

hunc fœtum] Ed. Lugd. Batav. 1662 has *hunc factum.*

P. 82. l. 11–12 from top.

Whartono innominata dicta] See *Adenographia . . . Authore Thomâ Whartono.* Londini 1656. c. XXVI pp. 176–187. *Wharton*, as was common in those days, described a *glandula lacrymalis* and a *glandula innominata.* The former is situated in the inner canthus of the orbit and in many mammals is actually a lachrymal gland, corresponding to the *caruncula lacrymalis* in man. The latter, *glandula innominata*, is situated in the lateral part of the orbit and is the one now called the lachrymal gland. – *Wharton*, having discussed the various theories concerning the secretion of tears (p. 178) gives his own view (pp. 181–182). P. 182: *Certum eſt, cerebrum in mærore contrahi; & contractum, aliquid exprimere; cúmqve materia tenuior, factâ compreſſione, facilius exiliat quàm craſſior; fit, ut ea ſic expreſſa valde tenúis ſit, aptéq; lachrymarum formam ſuſcipiat.* According to *Wharton*, the tears pass along the nerves into the eye, out of which they pass through minute pores. He does not believe tears to be secreted from his *glandula lacrymalis (caruncula lacrymalis)*, but still he adds (p. 182): *non tamen planè nego, quin aliquæ cerebri humiditates per hanc partem evacuentur.* About the function of his *glandula innominata (glandula lacry-*

malis) he says (p. 183): Uſus *hujus glandulæ propemodum coincidit cùm priore . . . , et hæc quoque humiditates quaſdam, quanquam non totam lachrymarum materiam, oculo ſuppeditat.* While *Steno* maintains that *glandula innominata* secretes the tears, he does not object to *glandula lacrymalis* being a gland, and perhaps he tacitly takes it for granted that its function is, also, that of secreting lachrymal fluid. Observe that the examinations of *Wharton* and *Steno* were made on animals, not on man. Besides, *Steno* was the first to prove that the upper and lower lachrymal ducts are the channels, along which the tears are conveyed to the cavity of the nose.

P. 82. l. 12—13 from top.

conglomeratarum . . . munus] On *Sylvius's* classification of the glands, see note to vol. I p. 20. l. 17—18 from bottom.

P. 82. l. 11 from bottom.

Platerus meminit] See *Felicis Plateri . . . Praxeos Seu de cognoſcendis, prædicendis, præcauendis, curandisq́; affectibus homini incommodantibus Tractatvs I—III.* Basileæ 1608—1609. vol. III sect. 2. c. VII p. 734.

P. 85. l. 18—19 from top.

Platerus ſtatuit] *Ibid.* p. 737 and following pages.

P. 85. l. 14 from bottom.

Veſlingius putat] See *Ioannis Veslingii . . . Syntagma Anatomicvm, Locis plurimis auctum, emendatum, nouiſque iconibus diligenter exornatum.* Patavii 1647. c. XV p. 198: *Vnde igitur liquor ille, inquies, in dolore tam fœcundus, tam paratus? Non ab ipſis ſanè oculis, ſed à cerebro, per ſecundum cuneiformis oſſis foramen, tum à vertice capitis ac lateribus ad punctorum propoſitorum ductus confluit.* This passage is not found in Ed. Francofurti 1641 nor, as is most likely, in the original edition (Patavium 1641). — *Secundum cuneiformis ossis foramen* is the *fissura sphenoidalis ossis sphenoidei.* — See *Syntagm. Anat.* Tabvlæ Cap. XIII Declaratio. p. 167 and fig. V on p. 169.

P. 85. l. 11 from bottom.

Clariſſ. *Schneiderus]* A very elaborate account of the various theories concerning the process of secretion of tears is to be found in *Conradi Victoris Schneideri . . . Liber De Catarrhis Tertius . . .* Wittebergæ 1661. See p. 329. *Schneider's* own view is spoken of on p. 501 and the following pages. See note to vol. I p. 28. l. 4 from top.

P. 85. l. 10—11 from bottom.

Ingenioſiſſimus *Carteſius]* See *Les Passions De L'Ame. Par René Des Cartes.* A Paris 1649. Article CXXVIII p. 169: *Et pour bien entendre leur origine, il faut remarquer que bien qu'il ſorte continuellement quantité de vapeurs de toutes les parties de noſtre corps, il n'y en a toutefois aucune dont il en ſorte tant que des yeux, à cauſe de la grandeur des nerfs optiques, & de la multitude des petites arteres par où elles y vien[n]ent; Et que comme la ſueur n'eſt compoſée que des vapeurs, qui ſortant des autres parties ſe convertiſſent en eau ſur leur ſuperficie, ainſi les larmes ſe font des vapeurs qui ſortent des yeux.*

P. 86. l. 3 from top.

Wharton. Adenogr. c. 26] pp. 178—179.

P. 89. l. 8 from top.

oculos erudiere] *Ovidius, Remedia Amoris,* 689—690:

Neve puellarum lacrymis moveare caveto:
Ut flerent, oculos erudiere suos.

P. 89. l. 16 from bottom.

juxta illud *Ovidii] Ars amandi* I 661—662.

P. 90. l. 12 from top.

Clariſſ. *Bartholinus]* See *Thomæ Bartholini Historiarum Anatomicarum Rariorum Centuria I et II.* Hafniæ 1654. Cent. II Hist. XCVII p. 345.

P. 90. l. 1—2 from bottom.

glandulæ . . . ſudorem producant] See Letter from *Steno* to *Th. Bartholin* in *Epist. Medicin. Cent. III.* Hafniæ 1667. Epist. LXV p. 263. It is found as No. VII in the present Edition, vol. I p. 101.

VI

DE NARIUM VASIS.

This Treatise must have been composed in December 1661, being written as an appendix to the preceding one, *De Glandulis Oculorum,* which bears the date of December 6, 1661, and together with which it appeared in print about New-Year 1662, as the last of the four Treatises in *Nicolai Stenonis Observationes Anatomicæ* . . . Lugd. Batav. 1662.

P. 93 l. 6—7 from bottom.

Libr. de Carn.] Hippocrates, De Carnibus (Περὶ ἀρχῶν ἢ σάρκων) 16. Ed. Littré. vol. VIII p. 604.

P. 94. l. 12—13 from top.

aqvæ ductum] Aqvæ ductus is now called *Tuba Eustachii.*

P. 94. l. 13—14 from top.

tunicæ Schneidero pituitariæ appellatæ] See note to vol. I p. 28. l. 4 from top and p. 69. l. 11 from bottom.

P. 94. l. 13 from bottom.

Veſlingius exiſtimat] See *Ioannis Veslingii . . . Syntagma Anatomicvm . . .* Patavii 1647. c. XV p. 197: *Recumbit in eo* [sc. cantho interno] Caruncula *ſpongioſa, & mollis, meatum ſubiecti oſſis, qui ad nares pertingit, operiens, ut fluxum per eas lacrymarum impediat; unde lacrymalis dicta eſt.* The last four words are not found in Ed. Francofurti 1641.

P. 94. l. 9—10 from bottom.

hujuſmodi] Schneider has *ejusmodi* instead of *hujuſmodi* and in the next line *ea foramina* instead of *hæc foramina.*

P. 94. l. 2 from bottom.

de ocul. part. 1. c. 13] See *Hieronymi Fabricii Ab Aqvapendente De Visione Voce Avditv.* Venetiis 1600. Pars I c. 13. p. 25.

P. 95. l. 2—3 from top.

in utroqve angulo] Ed. Venet. has *vnoquoq;* instead of *utroqve.*

P. 95. l. 11—12 from top.

nervoſum] Nervosus was still at that time used in a sense closely corresponding to what was afterwards called *fibrosus.*

P. 95. l. 10 from bottom.

non raro notavi] The following

description applies to the conglomerate nasal gland, *glandula nasalis Stenonis*, about which *Steno* expressly states that it is not found in man.

P. 96. l. 18—19 from bottom.

in utravis parte una] The following description refers to *ductus incisivi s. nasopalatini*, also called the *canales Stenonis* after the name of their discoverer. These ducts are the remainder of the wide aperture between the mouth and the nasal cavity which exists in early fetal life, an aperture which in man closes before birth, whereas it remains in many animals. The Organ of *Jacobson*, discovered by a countryman of *Steno*, opens into these ducts.

P. 96. l. 9 from bottom.

tertii maxillæ offis ſupercilium] *Os tertium maxillæ* is what is now called *processus nasalis maxillæ superioris*.

P. 97. l. 6—7 from bottom.

Κρατέει . . . τοὺς πόνους] *Steno* possibly has in mind the following passage in *Hippocrates, De Epidemiis* (Περὶ Ἐπιδημιῶν) VI 5, 5 Πόνος, τοῖσιν ἄρθροισι καὶ σαρκὶ σῖτος, ὕπνος σπλάγχνοισιν. See Ed. Littré, vol. V p. 316 and note on p. 317.

VII

SUDORUM ORIGO EX GLANDULIS. DE INSERTIONE & VALVULA LACTEI THORACICI & LYMPHATICORUM.

This Letter from *Steno* to *Th. Bartholin*, dated January 9, 1662 (new style), accompanied the copy of the then just published *Observationes Anatomicæ* . . . Lugd. Batav. 1662, sent by *Steno* to *Bartholin*. The Letter is found in *Th. Bartholini Epist. Medicin. Cent. III.* Hafniæ 1667. pp. 262—266, numbered *Epist.* LXV.

P. 101. l. 5 from top.

a *Diſputatione*] *Steno's Disputatio Anatomica De Glandulis Oris* . . . Lugd. Batav. 1661, appeared early in July. It was reprinted as the first of the four Treatises in *Observationes Anatomicæ*, published immediately after New-Year 1662. It is found as II in the present Edition, vol. I. p. 9.

P. 101. l. 8 from top.

excurſione avocatus] See vol. I p. 55.

P. 101. l. 11 from bottom.

Sylvius conglomeratas nominat] See note to vol. I. p. 20. l. 17—18 from bottom.

P. 102. l. 19—20 from top.

a Clariſſ. *Borrichio* tibi illa ſignificari] The letter from *Ole Borch* to *Th. Bartholin* to which *Steno* refers in this place, bears the same date as *Steno's*, viz. January 9, 1662. It is found in *Th. Bartholini Epist. Medicin. Cent. III.* Hafniæ 1667. pp. 416—425, numbered *Epist.* XCVII.

P. 102. l. 17 from bottom.

fui occupatus] See vol. I p. 57. l. 18 from top.

P. 102. l. 1—2 from bottom.

D. *Blaſium* . . . fraterqve ejus] See the Introduction and the previous Treatises *passim*. Concerning *Blaes'* brother see notes to vol. I p. 4. l. 15 from top and p. 19. l. 15 from bottom.

P. 103. l. 7—8 from top.

Magnifico Domino Cancellario] The Danish nobleman *Peder Reedtz* (1614—1674) was appointed Chancellor of Denmark in 1660. The following year he became Patron of the University of Copenhagen (see *Dansk biografisk Lexikon*, vol. XIII p. 564). — *Bartholin* endeavoured to pave the way for the appointment of *Steno* to a professorship at the University. However, he later on gave up this for the benefit of *Matthias Jacobæus*. See note on p. 226.

VIII

CUR NICOTIANÆ PULVIS OCULOS CLARIORES REDDAT. DE LACTEA GELATINA OBSERVATIO.

This Letter from *Steno* to *Th. Bartholin* is dated Leyden May 21, 1662. It is found in *Thomæ Bartholini Epist. Medicin. Cent. IV.* Hafniæ 1667. pp. 1—10, numbered *Epist.* I.

Bartholin's reply of February 14, 1662 (*Epist. Medicin. Cent. III.* Hafniæ 1667. *Epist.* LXVI) to *Steno's* Letter of January 9 (*ibid.* p. 262. Vol. I p. 99 in the present Edition) contains, on p. 267, the following request, which occasioned the appearance of this Letter. *Tu videris, an ex ductus tui*[1]*) cum oculis commercio copioſus humor ex oculis per nares educatur pulvere nicotianæ. Teſtabatur mihi olim illuſtris* Wormius *Conſulem Chriſtiano Hafnienſem*[2]*) imbecilli viſu laborantem ope talis pulveris optimè reſtitutum. Idem in ipſo me expertus ſum. Acutius enim multò video objecta remotiora poſt uſum pulveris tabaci.*

[1]) *i. e. canalis naso-lacrymalis.*

[2]) In 1618 *Christian IV* had founded the town of Christianshavn on the north-west point of the isle of Amager, opposite to Copenhagen. In 1674 it was incorporated with Copenhagen.

P. 107. l. 10—11 from top.

placuiſſe tibi . . . oſtendiſti] Concerning this, see *Bartholin's* Letters to *Steno* of February 14, 1662, in *Epist. Medicin. Cent. III.* Hafniæ 1667. Epist. LXVI p. 266—267, and to *Ole Borch*, of the same date, *ibidem*. Epist. XCVIII p. 426. See note to vol. I p. 103. l. 7—8 from top in the present Edition.

P. 108. l. 9 from top.

Qvod D. *Blaſium* ſpectat] See note to vol. I p. 102. l. 1—2 from bottom.

P. 108. l. 16 from bottom.

Nec *Deuſingii* opprobria moror] See the Introduction and the Treatises II, III and especially IV in the present Edition.

P. 108. l. 14 from bottom.

Bilſii fautorem] See the Introduction, the note to vol. I p. 6. l. 11 from bottom, and previous Treatises *passim*.

P. 109. l. 18 from top.

in *Lilii Gyraldi Dialogis] Lilio Gregorio Giraldi* (1479—1552), born in Ferrara, a Protonotary Apostolic, was a good poet and an expert archæologist. The first complete edition of his works appeared in Basle, 1580; but in this the editor has not been able to find the treatise referred to by *Steno;* on the other hand, see *Lili Gregori Gyraldi . . . Opera Omnia . . .* Lvgdvni Batavorvm 1696. vol. II Dialogismus VII. *Ad Vincentium Madium Philoſophum de faſcino & faſcinatione.* p. 873: *Faſcinatio autem*

morbus eſt, qui ex ſpiritu faſcinantis per oculos faſcinati ad cor ipſius ingreſſo pervenit: ſpiritus enim cordis à calore ex puriori ſanguine generatur. Tales autem ſunt in nobis ſpiritus, qualis eſt ſanguinis humor. Spiritus autem ſimiles ſibi radios per oculos quaſi per vitreas feneſtras emittit. Cor enim ſuo perpetuo quodam motu proximum ſibi ſanguinem agitans ex eo ſpiritu, in totum corpus, perque illos luminum ſcintillas per membra diffundit quidem ſingula, per oculos autem maxime. Ad altiſſimas partes, cum ſit leviſſimus, maxime evolat ſpiritus, ejuſque lumen per oculos cum perſpicui maxime & nitidi ſint, maxime emicat. Nam quod aliquod lumen in oculis ſit, patet ex eo, quod quorundam brutorum oculi in tenebris micant.

P. 109. l. 18—19 from bottom.

Carteſius . . . in ſuo *De Homine Tractatu]* In the work in question *Descartes* has nothing to that effect about the tears. *Steno* no doubt had in mind what he says in *Les Passions De L'Ame*, Article CXXVIII. See note to vol. I p. 85. l. 10 from bottom.

P. 109. l. 10—11 from bottom.

detectis novis lacrymarum . . . rivulis] See the Treatise V in the present Edition, especially vol. I p. 85. l. 10 from bottom.

P. 110. l. 14 from bottom.

in *Peireskii Vita Gaſſendus]* See *Viri Illvstris Nicolai Clavdii Fabricii De Peiresc . . . Vita, Per Petrvm Gassendvm . . .* Parisiis 1641. lib. V p. 280: *Animaduertit ſi quidem oculos ſuos ſic excipere imagines rerum, vt aſſeruarent illas diutiùs, & maximè quidem cùm à ſomno humeſcerent. Sic expertus eſt millies, cùm reſpexiſſet in feneſtram clathris igneis, quadratuliſque papyraceis interſtinctam, circumferre ſeſe deinceps illius formam in oculis; ſed cum eo diſcrimine, vt ſi clauſos quidem contineret, tum clathros obſcuros, & quadratula candida, cuiuſmodi conſpecta fuerant, videre adhûc videretur.*

P. 110. l. 10—11 from bottom.

cum Nobil. *Gerſtorphiis* meis] *Ole Borch* was for five years the tutor of the sons of *Joachim Gersdorf*, the Lord High Steward of Denmark. When in 1660 he was appointed professor at the University of Copenhagen and went abroad, this connection ceased. In 1661, however, *Joachim Gersdorf* died, and his sons were sent abroad to be once more in the care of *Borch*. *Steno* made their acquaintance in Holland. See *Dansk biografisk Lexikon*, vol. II p. 501.

P. 111. l. 6 from bottom.

cum *Rolandi Sturmii . . .* tractatu] *Febrifugi Peruviani Vindiciarum Pars Prior (et Altera) . . . Auctore Rolando Sturmio.* Delphis 1659. — In this book the author strongly advocates Peruvian bark as a remedy against fevers. The poem in honour of the author, placed at the beginning of the book, cannot be said to exaggerate when it opens with the following eulogy:

Iam fugiunt Rolande febres, jam pallida cedit
Mors tibi, jam vitam fama benigna refert.
Quem laudas veteri cortex ex arbore vitæ
Hic ſupereſt —

IX

OBSERVATIONES ANATOMICÆ IN AVIBUS & CUNICULIS.

This Letter from *Steno* to *Th. Bar-*

tholin is dated Leyden August 26, 1662. It is found in *Thomæ Bartholini Epist. Medicin. Cent. IV.* Hafniæ 1667. pp. 103—113, numbered *Epist.* XXVI.

P. 115. l. 10 from bottom.

De Clariſſimo *Blaſio]* On *Steno's* controversy with *Blaes* concerning the priority of the discovery of the duct of the parotid gland, see the Introduction, the previous Treatises *passim* as well as the notes belonging to the latter, and *Apologiæ Prodromus* (XIII, vol. I p. 143 in the present Edition). The following part of the Treatise refers to a statement of *Bartholin's* in a letter to *Steno*, dated Copenhagen February 14, 1662, which is found in *Epist. Medicin. Cent. III.* Hafniæ 1667. Epist. LXVI pp. 267—268: *D.* Blaſius *ſuſpectum me habet, nullo meo merito, iccircò nuper me purgavi, qvia nollem inter vos ſimultates, ſperemq́; me inter vos reducturum tandem amicitiam.*

P. 116. l. 1 from top.

van Horne aggreſſus ſit] As to this, see the Introduction, but especially *Steno's Responsio ad Vindicias Hepatis Redivivi* (IV vol. I p. 59 in the present Edition); see, moreover, most of the previous Treatises *passim.*

P. 116. l. 6 from top.

apud *Lucianum* Timon] See *Lucianus*, Τίμων 2.

P. 116. l. 12 from top.

acceſſit etiam *Antonius Everhardi]* See *Steno's Disputatio Anatomica De Glandulis Oris . . . Secunda.* Lugd. Batav. 1661 (II vol. I theses 49—52, pp. 46—49 in the present Edition). To this *Everaerts* replied in his *Lux è Tenebris Affulſa, Ex Viſcerum Monſtroſi Partus Enucleatione Propositaq. Ab Anthonio Everardi . . .* Medioburgi 1662.

P. 116. l. 14 from bottom.

qvod Hollandicis denegavit] Middelburg is in the province of Zeeland, Leyden in the province of Holland.

P. 117. l. 2 from top.

nulla ratione poſſem evitare] *Th. Bartholin* was the discoverer of the lymphatic vessels. See note to vol. I p. 3. l. 1 from top.

P. 117. l. 7—8 from top.

in corvo aqvatico] *i. e. Phalacrocorax carbo* (L.).

P. 117. l. 11—12 from bottom.

Parens . . . in *Anatomicis Inſtitutionibus] Casp. Bartholini . . . Institvtiones Anatomicæ . . . ab Auctoris Filio Thoma Bartholino.* Lvg. Batavorvm 1641, lib. I c. XV p. 90 has about *ductus communis: & oblique inſeritur inter utramque inteſtini tunicam, [digiti longitudine] & quidem aliquando bifidus . . .* The edition of 1641 is the first edition, which was revised by *Th. Bartholin.* The editor of the present work has not seen the original edition (Wittenberg 1611). In the oldest reprint from it, that of Rostock 1622, the two words within brackets are not found.

P. 118. l. 10 from top.

ex *Harvæi* ſententia] See *Exercitationes De Generatione Animalium . . . Autore Gvilielmo Harveo . . .* Londini 1651. Exercit. 6. p. 21: *infra jecur ventriculus poſitus eſt; cui ſubjacent inteſtinorum volumina, cum plurimis tenuibus membranis interjectis, aëre repletis;*

quippe in has, ut diximus, aſperæ pulmonum arteriæ foraminibus hiulcis aperiuntur.

P. 118. l. 17 from top.

cum Celeberrimo *Piſone] Willem Piso* (1611—1678), who was born in Leyden, took his doctor's degree in Caen in 1630, and in 1637 he became Physician in Ordinary to Count *Joan Maurits* of Nassau. He took part in a long journey to Brazil, and, from 1648 until his death, he lived as a physician in Amsterdam. Among other works he is the author of *De Medicina Brasiliensi Libri Qvatvor* ... Lvgdvn. Batavorvm et Amstelodami 1648 and *De Indiæ Utriusque Re Naturali Et Medica Libri Qvatvordecim* ... Amstelædami 1658. See *Biogr. Woordenboek der Nederlanden*, vol. XV p. 332 and *Biographisches Lexikon der hervorrag. Aerzte von E. Gurlt*, vol. IV p. 577.

P. 118. l. 18 from top.

Dn. *Gottwaldo] Cristoph Gottwaldt* (1636—1700) was a learned physician and scientist from Dantzic *(Gedanum)*. He was made a doctor in Leyden 1662. See *Biographisches Lexikon der hervorrag. Aerzte von E. Gurlt*, vol. II p. 609.

P. 120. l. 13 from top.

Carteſii Tractatus de Homine] Renatus Des Cartes De Homine Figvris Et Latinitate Donatus A Florentio Schuyl, Inclytæ Urbis Sylvæ Ducis Senatore, & ibidem Philoſophiæ Profeſſore. Lvgdvni Batavorum 1662. The French original appeared two years later. — *Sylva Ducis* is the Dutch s'Hertogenbosch.

X

EX VARIORUM ANIMALIUM SECTIONIBUS HINC INDE FACTIS EXCERPTÆ OBSERVATIONES CIRCA MOTUM CORDIS AURICULARUMQVE & VENÆ CAVÆ.

The observations mentioned in this Treatise are either identical with those mentioned in the previous Letter to *Th. Bartholin* (IX, vol. I p. 113 in the present Edition) or they are closely connected with the latter, being in all probability made almost at the same time, *i. e.* in Leyden in 1662. The text itself practically only consists of brief notes on each observation, and *Steno* has made no attempt to work them up into a whole; no doubt they were meant to form part of an exhaustive study on animal motion or more especially on the motion of the heart, which work, however, he never accomplished. The very last part of the Treatise, from *Poſſent inde alia* (p. 127. l. 9 from top) to the end, in language as well as in contents, differs from the other part, and has certainly been added by *Steno* at a far later period, viz. when from 1672 till 1674 he was *Anatomicus Regius* in Copenhagen and left the Treatise in the hands of *Bartholin* to be published by him in *Acta Medica Et Philosophica Hafniensia*, where it is found in vol. II, 1675, as No. XXXXVI p. 141.

P. 124. l. 9 from top.

repetitis] *Acta Hafn.* has *repetitus.*

P. 124. l. 11 from top.

& arteriæ ductus] *Acta Hafn.* has *ex arteriæ ductus.*

P. 126. l. 1 from top.

In corvo aqvatico] See note to vol. I p. 117. l. 7–8 from top.

P. 127. l. 1 from bottom.

Stultitia caruiſſe] Horatius, *Epistolæ*, I 1, 41–42.

XI

DE VESICULIS IN PULMONE. ANATOME CUNICULI PRÆGNANTIS. IN PULMONIBUS EXPERIMENTA. DE LACTEIS MAMMARUM. IN CYGNO OBSERVATIONES &C.

This Letter from *Steno* to *Th. Bartholin*, dated Leyden March 5, 1663, is found in *Thomæ Bartholini Epist. Medicin. Cent. IV.* Hafniæ 1667. pp. 348–359, numbered *Epist.* LV.

P. 131. l. 4 from top.

binis . . . beatus litteris] Only one of these letters is known, viz. the one found in *Epist. Medicin. Cent. IV.* p. 113, numbered *Epist.* XXVII, dated Copenhagen September 7, 1662.

P. 131. l. 9 from top.

De . . . *Malpighii* obſervationibus] The results of *Malpighi's* examinations of the structure of the lung, together with his demonstration of the existence of small *vesiculæ* in the latter, were published for the first time in *De Pulmonibus Epistolæ II ad Borellium*, Bononiæ 1661. In his above-mentioned Letter to *Steno*, *Bartholin* had spoken of these observations of *Malpighi's* and called upon him to further examine the question. *Bartholin* had also written to *Ole Borch* and *van Horne* about it, and in 1663 he reprinted *Malpighi's* Letters in Copenhagen: *Thomæ Bartholini De Pulmonum Subſtantia & Motu Diatribe. Accedunt Cl. V. Marcelli Malpighij de Pulmonibus Obſervationes Anatomicæ.* Hafniæ 1663.

P. 132. l. 4–5 from bottom.

Dominus *Swammerdamius]* *Joannes Swammerdam* (1637–1680), born in Amsterdam, was the son of a chemist of that town, who was intensely interested in curiosities of art and nature. In Amsterdam young *Swammerdam* began to study medicine, especially anatomy, under *Blaes* and *Tulp*. At this early period he made the acquaintance of *Steno*, which acquaintance soon ripened into friendship. Afterwards they both studied in Leyden, under *Sylvius* and *van Horne*, and here the two students made many joint investigations, which co-operation, as mentioned in the Introduction, was later on continued at *Thévenot's* in Paris and Issy. In 1665 *Swammerdam* was once more in Amsterdam, and in 1666 he was in Leyden, where in the following year he was made a doctor. In spite of splendid offers from abroad *Swammerdam* preferred to stay in Holland. He went to live in Amsterdam, where he lead a retired life in the house of his father, but religious scruples gradually got the upper hand of his otherwise clear intellect; he gave up his scientific studies, and especially after he had came under the influence of *Antoinette Bourignon* his mind gave way altogether. — *Swammerdam* made many valuable anatomical and physiological discoveries; but his name is chiefly associated with the study of insects and their biology, a branch of science which he was not only the first to cultivate, but

which he also enriched with numerous excellent observations. The manuscript of his chief work, which was for a long time looked upon as lost, was found many years after his death and was edited in Dutch and Latin by *Boerhave: Joannis Swammerdammii . . . Biblia Naturae; Sive Historia Insectorum* . . . Leydae 1737—1738. See, besides, *Biogr. Woordenboek der Nederlanden*, vol. XVII 2 p. 1095.

The experiment mentioned in the text, is spoken of in *Johannis SwammerdamI . . . Tractatus Phyſico-Anatomico-Medicus De Respiratione Uſuque Pulmonum.* Lugduni Batavorum 1667. c. III p. 19 ff., but it had already been mentioned before by *Sylvius* in the Additamentum to his dissertation *De Respiratione, Usuque Pulmonum*, which appears as No. VIII in *Disputationum Medicarum Pars Prima* . . . Amstelodami 1663. See § 79 p. 126 and § 86 p. 131.

P. 133. l. 2 from top.

apud Dn. *Padbrugium] Epist. Medicin. Cent. IV.* has *Padburgium.* — *Rob. Padbrugge*, a physician, published *De Apoplexia.* Lugd. Batav. 1663. (See *Jöckers Gelehrten-Lexikon, Fortsetz. v. Rotermund.* vol. V. Bremen 1816. col. 1370). — *Swammerdam's Tractatus . . . De Respiratione Uſuque Pulmonum* has ſect. II c. II p. 77: *Conſiderandum itaque* Primo. *Quod* Sanguis *in Inſpiratione (à Diaphragmate ſe contrahente, atque abdominis viſcera deorſum, introrſum, ac extrorſum cogente; ut & à Thorace ſurſum moto, Aëremque ſimul cum Diaphragmate in corporis circumjectas partes atque Pulmones propellente & impellente) è* Venis *Corporis tam* Superioribus *quàm* Inferioribus *diverſus ac copioſior ſolito, in Pectus atque Cor verſus moveatur:* ut obſervatum ab Amico noſtro D. Padtbrugge in Corollariis Theſium Inauguralium Lugd. Bat. habitarum anno 1662.

P. 133. l. 3—4 from top.

ab ingenioſiſſimo Dn. *Lahr] Epist. Medicin. Cent. IV.* has Dn. *Laer.* — *Haller, Bibliotheca Anatomica* I p. 717 mentions *P. v. der Lahr* as the author of *De fermentatione, effervescentiis & inflammatione.* Leid. 1685. See also *Epist. Medicin. Cent. IV.* Epist. LXX pp. 418—419 (XIV vol. I p. 159. l. 11 from bottom in the present Edition).

P. 133. l. 7 from bottom.

Sane *Schenckium* nil vidiſſe] See *Ioh. Theod. Schenckii . . . Exercitationes Anatomicæ Ad Vsvm Medicvm Accommodatæ.* Ienæ 1662. — When *Steno* here speaks of *Schenck*, and when a little further on he mentions the different ways in which the chyle, by various anatomists, was supposed to be conveyed direct to the mammæ, he does so referring to the following passage in *Th. Bartholin's* Letter of September 7, 1662, *Epist. Medicin. Cent. IV.* Epist. XXVII p. 114: *Lacteas qvasdam ad mamillas recta ſurſum tendere vidit* Jo. Theod. Schenckius *I. I. Exerc. Anat. 7. Sect. 2. c. 32. Sed talem ſurculum ſeu canaliculum lacteum ex thoracico ad mūſculos thoracis, & exinde ad ipſa ubera furtim ſerpere obſervavit* Pecqvetus *Exper. IV. contra* Riolanum. *De ramulis qvibusdam ad uterum qvoq́; Deuſingius in Inſt. Anat. monet.*

P. 134. l. 15 from top.

ſupra abdominis muſculos eodem] See *Novus Et Genuinus Hominis Brutique Animalis Exortus. Authore Anthonio Everardi.* Mediobvrgi 1661. p. 133.

P. 134. l. 16—17 from bottom.

in reſponſione ad *Everhardum]* This reply never appeared. See, besides, the previous Treatises *passim.*

P. 134. l. 13 from bottom.

lymphaticorum tuorum ... veritas] Refers to *Bartholin's* discovery of the lymphatic vessels. See notes to vol. I p. 3. l. 1 from top, p. 6. l. 16 from bottom and p. 21. l. 1 from top.

P. 134. l. 10—11 from bottom.

hepati jungi dixi] Se IX, vol. I p. 117. — *Bartholin* dwelt on the obscurity of this passage in his reply, which is found in *Epist. Medicin. Cent. IV.* as Epist. XXVII. See p. 115.

P. 134. l. 4 from bottom.

M. A. Severini obſervatio] In his Letter to *Steno, Epist. Medicin. Cent. IV.* Epist. XXVII p. 115, *Bartholin* referred to *Zootomia Democritæa: Id eſt Anatome Generalis totius animantium Opificii ... Marci Aurelii Severini.* Noribergæ 1645. pars IV p. 340, which has: *Jecur pauco, aut ferè nullo intervallo diſtans à corde, quod quidem parte poſteriore quaſi per ciſternæ os vaſa excipit.*

P. 135. l. 4—5 from top.

tractatulum curabo edendum] *Steno's De Musculis & Glandulis obſervationum ſpecimen* (XV vol. I p. 161 in the present Edition) appeared in Copenhagen in 1664. It contains several remarks referring to the controversies just mentioned; but a proper reply to *Everaerts* and *Deusing* never appeared. *Steno* replied to *Blaes* in *Apologiæ Prodromus* ... Lugd. Batav. 1663 (XIII vol. I p. 143 in the present Edition), caused by *Hoboken's Novus Ductus Salivalis Blasianus* ... Ultrajecti 1662. — See, moreover, *Steno's* next Letter to *Bartholin*, found in *Epist. Medicin. Cent. IV.* as Epist. LXX pp. 414—421. (XIV vol. I p. 155 in the present Edition.)

P. 135. l. 18—19 from top.

numerum ſemper obſervavi eundem] See IX vol. I p. 117.

P. 135. l. 9 from bottom.

diaphragmatis ... abſentiam ſupplentes] *Harvey* states that birds have no diaphragm. See *Exercitationes De Generatione Animalium ... Autore Gvilielmo Harveo* ... Londini 1651. Exercit. 6. p. 21 and note to IX vol. I p. 118. l. 10 from top.

P. 135. l. 2—3 from bottom.

de glandula vero lacrymali dicta] See note to vol. I p. 82. l. 11—12 from top.

P. 136. l. 1 from top.

in ventriculo nobili] *Ventriculus nobilis* is what is now called the Fourth Ventricle.

P. 136. l. 4 from top.

colorem ... interius cineritium] *Epist. Medicin. Cent. IV.* has *cineritiam* instead of *cineritium.* — The pineal gland, as is mentioned above, in certain animals exhibits this very distribution of colour; in the horse, for instance, the cells contain yellow and black pigment. As to *Bartholin's* opinion of *Steno's* observation, see his reply to the latter, in *Epist. Medicin. Cent. IV.* Epist. LVI p. 360.

P. 136. l. 11—12 from top.

a Nobiliff. *Carteſio* excogitata fabrica] See note to vol. I p. 120. l. 13 from top and *Steno's Discovrs Svr L' Anatomie Dv Cerveav*, which was delivered in Paris in 1665 (XVIII vol. II p. 1 in the present Edition).

XII

LYMPHATICORUM VARIETAS.

The investigations, on which this Treatise is based, were most likely made by *Steno* in collaboration with *Swammerdam*, some time in the years of 1662 and 1663; one of the drawings is likewise due to *Swammerdam* (see the Treatise). *Steno* had planned an exhaustive work on the lymphatic system, but never realized his plan. The text of this Treatise is, at any rate as far as the latter part is concerned, no doubt composed long after the time when the investigations were made, probably during *Steno's* stay in Copenhagen in 1672—1674. The Treatise appeared in *Thomæ Bartholini Acta Medica Et Philosophica Hafniensia*. vol. II Hafniæ 1675 as No. XCVII pp. 240—241.

XIII

APOLOGIÆ PRODROMUS, QVO DEMONSTRATUR, JUDICEM BLASIANUM & REI ANATOMICÆ IMPERITUM ESSE, & AFFECTUUM SUORUM SERVUM.

This Tract is the last of *Steno's* writings relative to his controversy with *Blaes* about the priority of the discovery of the parotid duct; concerning this controversy see the Introduction and the previous Treatises *passim*. This pamphlet was caused by a little book, with the title of *Novus Ductus Salivalis Blasianus, In lucem protractus A M. Nicolao Hoboken, Ultrajectino, Philoſophiæ & Medicinæ Doctore ac Practico*, Ultrajecti 1662, which *Nicolaas Hoboken* (1632—1678), a young friend of *Blaes*, published in his defence. In his pamphlet *Hoboken* stood forth as a judge in the quarrel between the two men. The judgment he pronounced was entirely in favour of *Blaes;* a decision at which he arrived all the more easily, as he did not enter into any investigations of his own in the matter in question. *Hoboken's* pamphlet consists of a preface, written by himself; an anagram on *Steno's* name (see below); a letter from *Hoboken* to *Blaes;* a letter from *Blaes* to *Hoboken;* three testimonials from former pupils of *Blaes;* a letter from *Blaes* to *Th. Bartholin*, dated Amsterdam July 16, 1661 (reprinted in *Thomæ Bartholini Epist. Medicin. Cent. III.* Hafniæ 1667. Epist. XLIII pp. 158—184); and last a letter from *Hoboken* to *Blaes*. About *Hoboken*, see *Biogr. Woordenboek der Nederlanden*, vol. VIII 2 p. 841.

P. 145. l. 6—7 from top.

Ductus Salivalis] Hoboken has *Ductus illius Salivalis.*

P. 145. l. 12 from bottom.

in ipſa Apologia] The Apology itself never appeared, as a reconcilement between *Steno* and *Blaes* took place before that time.

P. 145. l. 11 from bottom.

me *infelici puero comparando] Hoboken* has (p. 38): *Infelix puer atqve impar congreſſus Achilli!*

P. 145. l. 5 from bottom.

Verba in qvibus] The following passage is a somewhat condensed quotation from *Hoboken's* last letter to *Blaes*. See *Hoboken's* pamphlet p. 55 ff.

P. 146. l. 3—4 from top.

Anagrammate publice proclamat] The anagram runs as follows:

Super inventione
ductus Salivalis.
STENONIS,
Per Anagrammatiſmum,
IS NON EST.
SI NON EST,
SINON EST.

ANne Salivalem, ductuſque *invenerit uſum BLASIUS; anne prior tale Stenonis opus? Inſpice STENONIS nomen, converte; videbis, Ille quòd IS NON EST, qui eſſe* Stenonis *amat. Ex re nomen habet. Quòd si tum, candide Lector,* Stenonis *NON EST jure repertor: age, BLASIUS, ut fas est, DUCTUM inveniſſe SA-Dicatur PRIMUS; nec prior ullus eo. [LIVÆ BLASIUS inventor proſtet, non ille* Stenonis; *Fallax ritè SINON*[1]*) nomine quippe ſuo EST.*

[1]) Proditor Trojanus.

P. 146. l. 7 from top.

in Obſervationibus Anatomicis] *Nicolai Stenonis Observationes Anatomicæ*... Lugd. Batav. 1662. It is the first of the four Treatises in the book in question and had already been published in the previous year under the title of *Disputatio Anatomica De Glandulis Oris . . . Prima (& Secunda).* Lugd. Batav. 1661 (6—9 July). The parotid duct, however, had been mentioned still earlier by *Steno* in a Letter to *Th. Bartholin*, dated April 22, 1661. See I and II in the present Edition.

P. 146. l. 14 from top.

th. 13.] The original Paper has *th. V.*

P. 146. l. 16 from top.

Præceptores meos] *van Horne* and *Sylvius*. See notes to vol. I p. 4. l. 4—5 from top.

P. 146. l. 14 from bottom.

a ſe inventum proclamat] See note to vol. I p. 4. l. 12—13 from top.

P. 146. l. 8 from bottom.

Muidæ] Muiden, a town in the province of North Holland.

P. 146. l. 1 from bottom.

Qvod ſi *Blaſius* . . . in libro] See *Gerardi Blaſii . . . Medicina Generalis.* Amstelædami 1661.

P. 147. l. 6 from top.

uſui alii ignobili deſtinat] See II vol. I § 17. p. 25 and *Medicina Generalis*, c. XIII p. 24.

P. 147. l. 12 from bottom.

a *Blaſio* petierit *Bartholinus]* *Steno*, when he went to Holland, had a letter of introduction from *Th. Bartholin* to his relative, *Blaes*, who received *Steno* in his house. See the Introduction.

P. 147. l. 7 from bottom.

Dn. *Backmeiſtero]* *Joh. Bacmeister*, M. D. and Professor of Medicine at Rostock, son of *Matthæus Bacmeister*, edited in Amsterdam, 1663, *Franz Joël's Opera Medica*, in the first edition of which his father had already been engaged. See *Johannis Molleri Cimbria Literata.* Havniæ 1744. vol. II p. 50.

P. 148. l. 12—13 from top.

dicat *Whartonus]* See *Adenographia . . . Authore Thomâ Whartono.* Londini 1656. c. XXI p. 128 and c. XX p. 124.

P. 148. l. 14—15 from top.

diſtinctio Sylviana] See note to vol. I p. 20. l. 17—18 from bottom.

P. 149. l. 17 from top.

In diſputatione] *Disputatio de Triplici Coctione Prima*, thes. X : . . . *qvorum* [ɔ: ductuum] *unus ad maxillæ ſuperioris latus excurrit, alter ad inferioris extremitatem, circa menti interiora, ad latus frænuli lingvæ* . . . (quoted from *Blaes*' quotation in his Letter to *Th. Bartholin, Epist. Medicin. Cent. III.* Hafniæ 1667. Epist. XLIII p. 171.).

P. 149. l. 16 from bottom.

mentionem facit egreſſus ad buccas] The Letter mentioned in the note to p. 149. l. 17 from top contains, on p. 177, the following passage: *Nec tamen volumus ſalivam non niſi per foramina ea qvorum unum in qvovis ductu datur, amplum ſatis, papillari excreſcentiâ munitum, in oris cavitatem, exire,* . . .

P. 149. l. 12 from bottom.

nempe 8. Jul.] *Steno's* first and second Dissertations are dated July 6 and 9. The Letter from *Blaes* to *Bartholin* bears the date of July 16, 1661.

P. 149. l. 3 from bottom.

p. 35.] The original Paper has *p. 45.*

P. 150. l. 8—9 from top.

rem eſſe facilis indaginis] *Blaes* has *rem facilis eſſe indaginis.*

P. 151. l. 9 from bottom.

Prudentior . . . *Veſpa* erat] See *Phaedrus ed. L. Müller.* Lipsiæ 1877. III 13.

P. 152. l. 10 from bottom.

conglomeratas parotides] *Steno* calls the parotid gland *parotis conglomerata*, and a lymphatic gland imbedded in the parotid gland *parotis conglobata.* See vol. I § 10. p. 22.

P. 154. l. 6 from top.

oculis exponeret] The original Paper has *oculis exneret* and *po* has been added with ink in the only copy of the Paper, which the editor of the present Edition has seen (in The Library of the British Museum).

P. 154. l. 6—7 from top.

affectuum ſuorum] The original Paper has *affectum ſuorum.*

XIV

NOVA MUSCULORUM & CORDIS FABRICA.

This Letter from *Steno* to *Th. Bartholin* is dated Leyden ult. April, 1663. It is found in *Thomæ Bartholini Epist. Medicin. Cent. IV.* Hafniæ 1667. pp. 414—421, numbered *Epist.* LXX.

P. 157. l. 2 from top.

APOLOGIÆ *Prodromum]* XIII vol. I p. 143 in the present Edition.

P. 157. l. 2 from top.

Nicolao Kragio] *Niels Krag* is chiefly known on account of his controversy with the University of Copenhagen, which controversy was about payment for services rendered during the time of the siege. In 1667 he was made rector at Ourø, where he died in 1680. He was closely connected with the family of *Steno's*, and the sister of the latter, *Anna Kitzerow*, stood godmother to one of his children. See

Kirkehistoriske Samlinger, series III vol. V. Kjøbenhavn 1884–86. p. 315. *(Holger F. Rørdam.)*

P. 157. l. 5 from top.

exemplaria qvædam accepi] *Sylvii . . . Disputationum Medicarum Pars Prima . . .* Amstelodami 1663. This edition contains eight dissertations. The two dissertations of *Sylvius' De Febribus* are found as Nos. IX and X in the next edition.

P. 157. l. 10–11 from top.

me . . . abſoluturum] *Steno's De Musculis & Glandulis obſervationum ſpecimen* appeared in 1664, his *Elementorvm Myologiæ Specimen* in 1667, followed by *Hiſtoria Muſculorum Aquilæ* in 1675. See XV vol. I p. 161, XXII vol. II p. 61 and XXXII vol. II p. 257 in the present Edition.

P. 157. l. 7 from bottom.

nervoſam] See note to vol. I p. 95 l. 11–12 from top.

P. 158. l. 1 from bottom.

ut *Veſalius* deſcribit] See *Andreae Vesalii . . . de Humani corporis fabrica Libri ſeptem.* Basileae 1543. lib. VI c. X p. 587.

P. 159. l. 8–9 from top.

in *Anat.* tua *Reformat.*] *Thomæ Bartholini Casp. F. Anatomia, Ex Caspari Bartholini Parentis Institutionibus, Omniumque Recentiorum & propriis Observationibus Tertium ad sanguinis Circulationem Reformata Cum Iconibus novis accuratissimis.* Lugd. Batav. 1651.

P. 159. l. 13 from bottom.

a te litteras] See *Epist. Medicin. Cent. IV.* Hafniæ 1667. Epist. LVI pp. 359–363, dated April 7, 1663.

P. 159. l. 9 from bottom.

& *Beckero*] Perhaps identical with the *Becker* who in *Haller's Bibliotheca Anatomica* vol. I p. 707 is called *Daniel. Chriſtophori Becker*, where he is mentioned as the author of *De Reſpiratione.* Utrecht 1684. See, besides, the notes to vol. I p. 133. l. 2 and l. 4 from top.

P. 159. l. 7–8 from bottom.

compreſſionem vicinarum partium] See *Th. Bartholin's* letter *Epist. Medicin. Cent. IV.* Epist. LVI p. 359.

P. 160. l. 17–18 from bottom.

D. *Hobokium* . . . miſiſſe litteras, miror] See the introduction to the notes to *Apologiæ Prodromus* (XIII in the present Edition).

P. 160. l. 8 from bottom.

aperire licuit uteros] See *Th. Bartholin's* Letter *Epist. Medicin. Cent. IV.* Epist. LXI pp. 360–361.

P. 160. l. 7 from bottom.

promiſſa *Diatribe*] *Thomæ Bartholini De Pulmonum Subſtantia & Motu Diatribe. Accedunt Cl. V. Marcelli Malpighij de Pulmonibus Obſervationes Anatomicæ.* Hafniæ 1663.

XV

DE MUSCULIS & GLANDULIS OBSERVATIONUM SPECIMEN.

Nicolai Stenonis De Musculis & Glandulis obſervationum ſpecimen Cum Epiſtolis duabus Anatomicis, Hafniæ 1664, appeared in the same year in Amsterdam and was reprinted in Leyden in 1683. The investigations, on which the first Treatise is based, were made in Holland

in the immediately preceding years (1661—1663). Compare previous Treatises.

P. 167. l. 6—7 from top.

publicæ luci . . . expoſiturum] See *Steno's* Letter to *Th.Bartholin*, dated Leyden ult. April, 1663 (XIV vol. I p. 155 in the present Edition).

P. 168. l. 15—16 from bottom.

ad aliqvod tempus revertendi] About the time of the death of *Steno's* stepfather, *Johan Stichman* (November 1663), his mother was taken ill, for which reason he left Holland in the spring of 1664. His mother died shortly after his return to Copenhagen.

P. 169. l. 3 from top.

Adminiſtrat. Anatom. l. 7. § 8] *Galeni De Anatomicis Administrationibus Libri Novem. Steno* has, erroneously, *l. 7. § 9.*

P. 169. l. 6 from top.

de thorace l. 1. cap. 8] See *Casp. Hofmanni De Thorace, Ejusque Partibus Commentarius Tripartitus.* Francofvrti 1627. lib. I c. 8. p. 13. He adds: *Nervi enim dant motum animalem, qualis heic non eſt.*

P. 169. l. 15—16 from top.

cor muſculum pronuntiant] See *Hippocrates, De Corde* (Περὶ Καρδίης) 4. Ed. Littré. vol. IX p. 82 . . . ἡ καρδίη μοῦς ἐστι κάρτα ἰσχυρός, οὐ τῷ νεύρῳ, ἀλλὰ πιλήματι σαρκός.

P. 169. l. 19 from bottom.

D. *Harvæus]* See *Exercitatio Anatomica De Motv Cordis Et Sangvinis In Animalibvs, Gvilielmi Harvei* . . . Francofvrti 1628. c. II p. 22: *Ex his mihi videbatur manifeſtum; Motum cordis eſſe tentionem quandam ex omni parte, & ſecundum ductum omnium fibrarum, & conſtrictionem vndique, quoniam erigi, vigorari, minorari, & dureſcere in omni motu videtur, ipſiuſqūe motum eſſe, qualem muſculorū, dum contractio fit ſecundum ductum partium neruoſarum, & fibrarum, muſculi enim cum mouentur, & in actu ſunt vigorantur, tenduntur, ex mollibus duri fiunt, attolluntur, incraſſantur, & ſimiliter Cor.* See, also, *ibidem* p. 23. l. 13 from bottom : . . *& dum tenduntur fibræ* . . .

P. 169. l. 19 from bottom.

D. *Sylvius]* On *Sylvius'* conception of the function of the heart, see *e. g.* his dissertation *De Chyli Mutatione in Sanguinem, Circulari Sanguinis Motu, & Cordis, Arteriarumque Pulſu* [1659], which, as *Disputatio III*, constitutes pp. 23—38 of . . . *Sylvii* . . . *Disputationum Medicarum Pars Prima* . . . Amstelodami 1663. For instance § 9. p. 26: *In cordis ventriculo ſiniſtro accenditur iteratò & rarefit Sanguis ab eodem Igne Cordis interno, accipitqūe tunc ultimam ſui ab Ipſo perfectionem.* And § 16. p. 29: Naturalem *proinde putamus vocandam Cordis Ventriculorum Dilatationem, à Sanguine rareſcente factam, uti* Animalem *eorundem Contractionem per muſculos abſolutam, & Voluntati quodammodo parentem.* And § 33. p. 34: *Contrahi verò à Spiritibus animalibus parenchyma ipſius muſculoſum animali motu cientibus.*

P. 170. l. 6 from top.

Spigelius] See . . . *Adriani Spigelii* . . . *De Hvmani Corporis Fabrica Libri Decem* . . . Francofvrti 1632. lib. IV p. 134: *Initiūm autem habent* [sc. musculi

intercostales externi] *primum à tranſuerſis vertebrarum proceſſibus, quibus coſtas ſuo capitulo adnecti diximus.* The original edition is from Venice, 1627.

P. 172. l. 9 from bottom.

Arantio impoſuerit] See *Ivlii Caesaris Arantii . . . De Hvmano Foetv Liber Tertio editus, ac recognitus. Eivsdem Anatomicarvm Observationvm Liber . . .* Venetiis 1587. *Anatomicae Observationes.* c. XXXIV p. 98.

P. 172. l. 6 from bottom.

carnoſas ferri fibras] See note to vol. I p. 135. l. 9 from bottom.

P. 173. l. 16 from bottom.

hinc] The original edition, Hafniæ 1664, has *hic.* Edd. Amstel. 1664 and Lugd. Batav. 1683 have *hinc.*

P. 173. l. 9 from bottom.

per operationes cognoſcendam] See *Nicolai Massa . . . Liber Introductorius Anatomiæ, ſiue diſſectionis corporis humani, nunc primum ab ipſo auctore in lucẽ ęditus . . .* Venetiis 1536. c. XXXII p. 67: . . *& ideo rectius dicitur caro muſculoſa, non diſtinguibilis, ſicuti etiam ſunt labiorum muſculi, qui per ſectionem minime diſtingui poſſunt . . .*

P. 175. l. 11—12 from bottom.

qvam ſyringæ veterum aſſimilaveris] See *Francisci Glissonii . . . Anatomia Hepatis . . .* Londini 1654. c. XXI p. 211.

P. 178. l. 9—10 from top.

in gallo Africano] The name of *Gallina Africana* is used by *Gesner, Marcgraf* and others for the guinea-fowl, *Numida meleagris* (L.).

P. 179. l. 5—6 from top.

Plexus nervorum a *Falloppio* deſcriptus] *Falloppius* was the first to describe the plexus of the pneumogastric nerve with its many branches to the heart. See *Gabrielis Falloppii . . . Observationes Anatomicae, In quinque libros digeſtæ . . . Opera & ſtudio M. Iohannis Sigfridi Margſulenſis . . .* Helmstadii 1588. lib. IV c. XV pp. 184 b—186. The original edition appeared in Venice in 1561.

P. 181. l. 16 from top.

Hippocrati . . . qvi dicit] See note to vol. I p. 169. l. 15—16 from top.

P. 182. l. 8 from top.

ego ſumpſi] Edd. Amstel. 1664 and Lugd. Batav. 1683 have *ego ſum.*

P. 182. l. 4 from bottom.

Glandularum . . . natura] From here and onwards to the end the Treatise is chiefly taken up by a summary of *Steno's* discoveries as regards the anatomy and physiology of the glands. The greater part of it has consequently been mentioned before, in various places of the previous Treatises. In the notes to the following reference is made to the earlier Treatises, but only as far as the more important passages are concerned.

P. 183. l. 6 from top.

mundas reddiderunt] *Th. Bartholin* published his discovery of the lymphatic vessels in his book *Vasa Lymphatica, Nuper Hafniæ in Animantibus inventa, Et Hepatis exſeqviæ.* Hafniæ 1653. See, moreover, note to vol. I p. 6. l. 16 from bottom. Chap. VI p. 39 *Bartholin* writes: *Sunt aquæ in Oceano*

falſæ, ſunt & in fluvijs fontibusq; puræ & ſaporis expertes odorisq;, ſplendidiores vitro, quibus Najades & Ephydrides, Nymphæ puriſſimæ præſidebant. Nolumus has extra nos ſollicitare. Nymphas corporibus noſtris claudimus, & Najades in venis lymphaticis, ſi ſuperſtitioſis eſſe liceret, veneraremur. — As regards the conglobate and conglomerate glands, see note to vol. I p. 20. l. 17—18 from bottom.

P. 183. l. 7 from top.

Wirtzungio debent conglomeratæ] *Wirsung* was the first to find the pancreatic duct in the human body (1642), *Maur. Hoffman* having discovered it the year before in a turkey. Shortly after his discovery *Wirsung* was killed by another physician.

P. 183. l. 9—10 from top.

Whartoni... Deuſingius] *Wharton* published his discovery of the duct of the submaxillary gland in his *Adenographia*... Londini 1656. The editor of the present Edition has not been able to find anything about *Deusing's* relation to *Wharton* in those of *Deusing's* writings, which he has seen.

P. 183. l. 11 from top.

Blaſius] Concerning *Steno's* discovery of the parotid gland and *Blaes'* attempt to appropriate the honour of this discovery, see the Introduction and the previous Treatises *passim*, especially XIII.

P. 183. l. 14 from top.

in *Obſervationibus]* *Nicolai Stenonis Observationes Anatomicæ* . . . Lugd. Batav. 1662. It comprises II, IV, V and VI in the present Edition.

P. 183. l. 14—15 from top.

reliqva . . . exponam] *Steno* never published any extensive work on the glands; but he returned to these organs in his descriptions of the dissections of some rays and sharks. See the Treatises XVI vol. I p. 193, XXIII vol. II p. 113 and XXIV vol. II p. 147. See, also, the Appendix, vol. II p. 308.

P. 183. l. 19 from bottom.

Salivare exterius] See especially the Treatises I and II.

P. 183. l. 12 from bottom.

Epicuri intermundia] *Epicurus* maintained that there was an infinite number of worlds, between which were large and empty spaces, and that the atoms, flying through these spaces, united and thus made one world upon the other.

P. 183. l. 10—11 from bottom.

Apologiæ Prodromus] XIII vol. I p. 143 in the present Edition.

P. 183. l. 8 from bottom.

de teſtimoniis ejus] See the introduction to the notes to XIII, vol. I p. 252.

P. 184. l. 3—4 from top.

Anagrammaſticam Hobokianum] See note to XIII vol. I p. 146. l. 3—4 from top.

P. 184. l. 9 from top.

non erubuit] Concerning *Steno's* controversy with *Deusing* see especially the Introduction and Treatise IV in the present Edition.

P. 184. l. 14 from top.

Buccarum vaſcula] See II vol. I p. 26.

P. 184. l. 12–13 from bottom.

ſublingvalia dicta] See II vol. I p. 27.

P. 184. l. 5 from bottom.

ad alia non attendi] Cf. XI vol. I p. 135.

P. 185. l. 6 from top.

recipit vaſa] See II vol. I p. 27.

P. 185. l. 16 from top.

deſcendens meatus] See VI vol. I p. 96 and the note to p. 96. l. 18–19 from bottom.

P. 185. l. 14–15 from bottom.

in . . . œſophago . . . vaſa] See XI vol. I p. 135.

P. 185. l. 7 from bottom.

Qvæ narium tunicam irrigant vaſcula] See VI vol. I p. 95.

P. 185. l. 2–3 from bottom.

in ovibus . . . notatum] See VI vol. I p. 95.

P. 186. l. 2 from top.

in nariùm cava derivantes] See III vol. I p. 56 ff. and V p. 83 ff.

P. 186. l. 13. from top.

Vaſa palpebrarum] See V vol. I p. 81 ff.

P. 186. l. 17 from bottom.

in raja mihi conſpecta] See XVI vol. I p. 196 ff.

P. 186. l. 10–11 from bottom.

De Uſu Partium l. 2.] *Galeni De Usu Partium Corporis Humani Libri XVII.* lib II c. 3.

P. 187. l. 7 from top.

qvibus ſola evehentia contigere] *Steno* here, as always, describes the conglomerate glands as belonging to the lymphatic system and looks upon the excretory ducts of these glands as lymphatic vessels.

P. 187. l. 11 from bottom.

ad abſurdas . . . opiniones] See notes to vol. I p. 32. l. 8 from top and p. 68. l. 6 from bottom.

P. 187. l. 8–9 from bottom.

inſertionis varietas . . . patebit] See XII vol. I p. 139 ff. and note.

P. 187. l. 2–3 from bottom.

qvod . . . recipit] Ed. Hafniæ 1664 has *qva* instead of *qvod.*

P. 188. l. 2–3 from top.

per unicum . . . oſtium] See note to vol. I p. 187. l. 11 from bottom.

P. 188. l. 17 from top.

ductui bilario . . . gemino] See IX vol. I p. 117.

P. 188. l. 8–9 from bottom.

a . . . *Highmoro* . . . deſcriptam video] See *Corporis Hvmani Disqvisitio Anatomica; In Qva Sangvinis Circvlationem in quavis Corporis particula plurimis typis novis, ac Ænygmatum Medicorum ſuccinctâ dilucidatione ornatam proſequutus eſt Nathanael Highmorvs* . . . Hagæ-Comitis 1651. c. VIII p. 42 and plate IV p. 44.

P. 188. l. 3–4 from bottom.

Whartoni fidens obſervationi] See *Adenographia . . . Authore Thomâ*

Whartono. Londini 1656. c. XXI pp. 130—131. See, also, II vol. I p. 41.

P. 189. l. 3—4 from bottom.

ſubſtantiam glandulоſam] See VII vol. I pp. 101—102, XVI vol. I p. 196 and XXIII vol. II p. 116 ff.

P. 190. l. 5—6 from top.

In ventriculis cerebri] See XXVIII vol. II p. 234 ff.

P. 190. l. 9 from top.

Humoris, unde & *fit . . . fœtus]* See XXIV vol. II p. 153. *Steno* looked upon *villi* as being of glandular nature.

P. 191. l. 5 from top.

mentis imperio ſubjecta] As regards *Steno's* earlier view, which differs somewhat from the one expressed in this place, see the latter part of Treatise II in the present Edition, vol. I from § 30. p. 34, especially § 39. p. 38.

P. 191. l. 8 from bottom.

Antoniûs Everhardi] See *Novus Et Genuinus Hominis Brutique Animalis Exortus. Authore Anthonio Everardi.* Mediobvrgi 1661. p. 280 ff.

P. 191. l. 1 from bottom.

nullum videre potui tranſitum] See XI vol. I, especially p. 134 and note to p. 134. l. 15 from top.

P. 192. l. 9—10 from top.

nulla glandularum facta mentione] See note to vol. I p. 28. l. 4 from top.

P. 192. l. 11 from top.

glandularum uti operculo] This possibly refers to a remark of *Schneider's.* See *Conradi Victoris Schneideri Liber Qvintus Et Ultimus De Catarrhosorum Diæta.* Wittebergæ 1662. c. I pp. 84—85.

XVI

DE ANATOME RAJÆ EPISTOLA.

The dissections of the two rays, on which this Treatise is based, must have taken place in Copenhagen shortly after *Steno's* return, in the spring of 1664. The Treatise is dated April 24 (old style) 1664, and was published the same year, the second of three Treatises in *Nicolai Stenonis De Musculis & Glandulis obſervationum ſpecimen Cum Epiſtolis duabus Anatomicis.* Hafniæ 1664. It is dedicated to *Willem Piso* (see note to vol. I p. 118. l. 17 from top).

P. 195. l. 12—13 from top.

primus viam monſtrares] See IX vol. I p. 118.

P. 195. l. 14 from top.

corvi aqvatici ſectio] See IX vol. I p. 117 and note to p. 117. l. 7—8 from top.

P. 196. l. 1 from top.

oblatam] All editions have *ablatam.*

P. 196. l. 10 from top.

Binæ nobis erant rajæ] Probably *Raja batis.* See *C. C. A. Gosch, Udsigt over Danmarks zoologiske Literatur.* vol. II 1. Kjøbenhavn 1872. p. 190.

P. 196. l. 1 from bottom.

non tincta punctula] *Steno's* discovery of the mucous canals, and his other observations on the rays were carried on by his pupil *Lorenzini* in *Osservazioni Intorno Alle Torpedini Fatte Da Stefano Lorenzini . . .* In Firenze 1678.

P. 197. l. 5–6 from top.

id vidiſſem ſæpius] See VI vol. I p. 96.

P. 197. l. 15 from bottom.

defectum ſupplentes] See XIV vol. I p. 155, XV vol. I p. 172 ff., and especially XXII vol. II p. 67.

P. 198. l. 14 from bottom.

fuerint contextæ] See XV vol. I p. 174.

P. 198. l. 9 from bottom.

paſſerem marinum præter] As to what, at the time of *Steno*, was meant by *asellus minor, solea* and *passer marinus*, see *Historiæ Naturalis De Piscibus Et Cetis Libri V. Cum æneis figuris Iohannes Ionstonvs . . . conciñauit.* Francofvrti Ad Moenum [1649]. pp. 7–8 plate I 2, pp. 87–90 plate XX and p. 99.

P. 199. l. 12 from top.

xyſtico] Ed. Hafniæ 1664 has *I ystico.*

P. 199. l. 16 from bottom.

nervea] See note to vol. I p. 95. l. 11–12 from top.

P. 199. l. 3–5 from bottom.

Simon Paulli . . . inferuit] See *Simonis Paulli . . . Quadripartitum Botanicum De Simplicivm Medicamentorvm Facultatibus* . . . Argentorati 1667. p. 84. In the first edition, Rostock 1639, this is not mentioned.

P. 200. l. 2 from top.

eleganter] All editions have *elegantes.*

P. 200. l. 13 from top.

ipſe pronuntiat] *Exercitationes De Generatione Animalium . . . Autore Gvilielmo Harveo* . . . Londini 1651. Exercit. 4. p. 11: *Inſunt omnibus avibus, ſerpentibus, quadrupedibus oviparis, atque etiam piſcibus (ut facilè in* Cyprino *videre eſt) renes, & ureteres, per quos urina profluat: qvod* Ariſtotelem, *aliósqve hactenus Philoſophos latuit.* — See also *Aristoteles, De Animalibus Historia* (Ἀι περὶ τὰ Ζῷα Ἱστορίαι) lib. II c. 16.

P. 200. l. 12–13 from bottom.

repletam] All editions have *repletum.*

P. 201. l. 9 from bottom.

qvod . . . *Simoni Paulli* contigit] *Simon Paulli* may have communicated this to *Steno* by word of mouth; at any rate it is not mentioned in *Paulli's* writings.

P. 202. l. 2 from top.

Rondeletium] See *Gvlielmi Rondeletii . . . Libri de Piſcibus Marinis, in quibus veræ Piſcium effigies expreſſæ ſunt* . . . Lvgdvni 1554. lib. XII c. 4. pp. 342–344. In this place we find the picture of a ray's egg, which is described simply as an egg, not as the uterus of the fish. References to *Aristoteles, De Animalibus Historia* (Ἀι περὶ τὰ Ζῷα Ἱστορίαι) lib. I c. 5, lib. II c. 13 and especially lib. VI c. 10.

P. 202. l. 2 from top.

Geſnerum] See *Conradi Gesneri . . . Hiſtoriæ Animalium Liber IIII. qui eſt de Piſcium & Aquatilium animantium natura* . . . Tigvri 1558. p. 930, where *Rondelet's* description is reprinted *verbatim* together with the picture of the egg.

P. 202. l. 2 from top.

Jonſtonum] l. c. p. 34 and plate XII

fig. 4, facing p. 37. — See note to vol. I p. 198. l. 9 from bottom.

P. 202. l. 12 from top.

uterum expoſitum] See *Harvey, Exercit. De Generat. Animal.* Exercit. 22. p. 70: *Eſt Ovum (ut diximus) quaſi* uterus expoſitus, *et locus in qvo fœtus formatur: matricis enim munus obit . . .*

P. 202. l. 12 from bottom.

Harvæus Exerc. 68] *Ibid.* pp. 234—235.

P. 202. l. 3 from bottom.

exſpectant ovipara] As mentioned in the Introduction, *Steno* later on arrived at a far more correct view of this question, being the first to state that the *testes* of the females of the viviparous animals were the same organs as those called the *ovaria* in oviparous animals, and that also their function was exactly the same. See XXIV vol. II pp. 152—153.

P. 203. l. 5 from bottom.

pictura Authorum] This refers to the figure mentioned in the notes to vol. I p. 202. l. 2 from top.

P. 203. l. 3 from bottom.

extracta] All editions have *extractæ.*

P. 203. l. 1 from bottom.

propriæ] This word is not found in the Edd. Amstel. 1664 and Lugd. Batav. 1683.

P. 204. l. 5 from bottom.

aſperæ arteriæ] *Arteria aspera* is the trachea.

P. 205. l. 9 from top.

res . . . nulli controverſiæ obnoxia eſt] Cf. *Antiperipatias. Hoc Est Adversvs Aristoteleos De Respiratione Piscivm Diatriba . . . Marci Avrelii Severini . . .* Neapoli 1659. p. 1, and *Nova Experimenta Pneumatica Respirationem Spectantia. Authore Roberto Boyle.* Genevæ 1686. V. p. 12: Quæritur *etiam, Quouſque mereatur à nobis conſiderari, Númne in Aqua communi tantum Aeris lateat, qui uſui frigidorum ejuſmodi Animalium, ut ſunt* Piſces, *ſufficiat; atque num ſeparabilis ille ſit ab aqua, quæ per branchias ipſorum percolatur?*

P. 205. l. 17—18 from top.

non omnem . . . tranſmitti ſangvinem] The *foramen ovale* in the auricular septum of the fetus as a rule is being completely obliterated at birth; but occasionally a small oblique passage is left between the two auricles.

P. 205. l. 8—9 from bottom.

ut in ranis] See *Malpighius' De Pulmonibus Epistolæ II ad Borellium.* Bononiæ 1661. — *Malpighius* was the first to discover, by means of the microscope, that the ramifications of the trachea terminate in small *vesiculæ (alveoli)* surrounded by a fine network af arteries and veins. But it was not until he had begun to investigate lower animals, like frogs, that he succeeded in proving the anastomosis of the arteries with the veins through the capillaries. As to *Steno's* earlier view of this discovery see XI p. 131. l. 9 from top and note.

P. 206. l. 3 from top.

Apelles] See note to vol. I p. 14. l. 19 from top.

P. 206. l. 8—9 from bottom.

ex . . . tuis de itinere Braſilienſi

ſermonibus] The work *Historia Natvralis Brasiliae* ... Lvgdvn. Batavorvm et Amstelodami 1648 contains *Guilielmi Pisonis ... De Medicina Brasiliensi Libri Qvatvor* and *GeorgI MargravI ... Historiæ Rervm Natvralivm Brasiliæ, Libri Octo.* — See note to vol. I p. 118. l. 17 from top.

P. 207. l. 9 from top.

Bartholinus] *Th. Bartholin* while a professor at the University of Copenhagen often left town for long periods at a time and went to live at his estate Hagestedgaard.

XVII

DE VITELLI IN INTESTINA PULLI TRANSITU EPISTOLA.

The observation, on which this Treatise is based, must have been made after *Steno's* return to Copenhagen in the spring of 1664, and before the 12th of June (old style), the date of the Treatise. It was published together with the two previous Treatises (XV and XVI) in *Nicolai Stenonis De Musculis & Glandulis obſervationum ſpecimen* ... Hafniæ 1664. It is dedicated to *Paulus Barbette*, a celebrated Amsterdam surgeon and author of medical books. See *Biogr. Woordenboek der Nederlanden.* vol. II 1. p. 107.

In this Treatise *Steno* mentions his discovery of the vitelline duct in the newly hatched chicken. Observe, however, that this formation in the fetus of the hen was known and described as early as by *Aristotle*[1]), who also knew that the function of the vitelline duct was that of conducting the yolk into the intestines of the fetus, with the view of nourishing the latter. But *Aristotle* entirely misunderstood the manner in which the vitelline duct originates; he thought that is was a transformation of one of the two πόροι φλεβικοί that proceed from the heart at an early stage of the fetal life. The knowledge of the vitelline duct was preserved throughout the antiquity, until as late as the 16th century, its formation and function being very clearly described in 1573 by *Volcherus Coiterus*[1]). But after that, strange to say, the knowledge of the vitelline duct was lost, and though of course prominent investigators like *Fabricius ab Aqvapendente,*[2]) *Spigelius*[3]) and *Harvey*[4]) thoroughly knew the works of their predecessors, from *Aristotle* to *Coiter*, they did not understand that *Aristotle* and all his successors described a passage from the yolk-sac to the intestines, through which passage the yolk was conducted to the intestines with the view of nourishing the fetus. In their own investigations they never themselves came across the vitelline duct, and according to *Harvey* the nourishment of the fetus took place in a twofold manner, partly by the fetus swallowing the amniotic fluid, partly by its receiving the *purior et sincerior pars* of the latter direct into the vascular system through the umbilical veins.

[1]) *De Animalibus Historia.* VI 3.
De Generatione Animalium. III 2.

[1]) *Externarvm Et Internarvm Principalivm Hvmani Corporis Partivm Tabvlæ ... Avtore Volchero Coiter* ... Noribergae 1573. pp. 35—36.

[2]) *Hieronymi Fabricii Ab Aqvapendente De Formato Foetv.* Venetiis 1600.
Hieronymi Fabricii Ab Aqvapendente ... De Formatione Ovi, Et Pvlli Tractatvs Accvratissimvs ... Patavii 1621.

[3]) *Adriani Spigelii ... De Formato Fœtv Liber Singvlaris* ... Patauij 1626.

[4]) *Exercitationes De Generatione Animalium ... Autore Gvilielmo Harveo.* Londini 1651.

Thus, when *Steno* found the vitelline duct and correctly described its function, it was to him and his contemporaries a new and highly important discovery, though it may seem strange that this discovery had to be made afresh. In a letter to *Thévenot*, written after 1665 and printed two years later as part of *Elementorum Myologiæ Specimen*, Florentiæ 1667, p. 49 (XXII vol. II pp. 95—96 in the present Edition), *Steno* tells that it had been brought against him as a charge that the same discovery had been made at an earlier period by *Coiter*, *Huibertus* and *Meibomius*. As is mentioned above, it is quite true that *Coiter* had described the vitelline duct, but *Steno* was right in maintaining that when *Harvey*, who had spent several years of his life in studying these matters, did not understand *Coiter's* description, it was perfectly pardonable that he himself, who had never until then had anything to do with this subject, did not understand it either, while on the other hand he cannot be said to be right, when he maintains that *Coiter* expressed himself indistinctly.

As regards *Huibertus* the editor of the present Edition can give no information, not even as to his identity, and as to *Meibomius'* connection with this discovery of *Steno's* he has likewise been unable to find anything.

However *Steno* was not the first to find the vitelline duct, after the knowledge of it had been lost. Three years after the appearance of his above-mentioned book *Needham* relates that he had found the vitelline duct as early as 1654, however without having published his discovery.[1])

As to the demonstration of the vitelline duct in placental animals see the introduction to the notes to Treatise XXVI vol. II p. 167. See, moreover, *Vilhelm Maar, Om Opdagelsen af ductus vitello-intestinalis. Det Kgl. Danske Videnskabernes Selskabs Forhandlinger.* 1908. V p. 233 ff.

The figure belonging to this Treatise is to be found on p. 163 of this volume (right corner at the bottom).

P. 212. l. 19 from bottom.

vacabit] Ed. Hafniæ 1664 has *vocabit.*

P. 213. l. 18—19 from bottom.

juxta obſervationes *Harvæi]* See *Exercit. De Generat. Animal.* Exercit. 52 p. 164: Ariſtoteles *quidem* decimo poſt nativitatem die, *aliquid vitelli ſupereſſe reperit: nos autem, etiam* poſt ſex ſeptimanas, *nonnihil ejus, in ventre pulli, inteſtino affixum vidimus.*

P. 215. l. 17 from bottom.

authoritas *Ariſtotelis Harvæiqve]* See *Aristoteles, De Animalibus Historia* (Αι περὶ τὰ Ζῷα Ἱστορίαι) lib. VI c. 3 and *Exercit. De Generat. Animal.* Exercit. 52 p. 164: *quæ* [sc. venæ] *omnes in unum truncum collectæ, in venam Portæ perforantur; pleniorſque in jecore coctionis gratiâ, partem vitelli, quam abſorbent, eò deferunt.*

[1]) *Disquisitio Anatomica De Formato Foetu. Authore Gualtero Needham. M. D.* Londini 1667. c. IV p. 97 ff.

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AUTHOR
Nicolai Stenonis opera philo-
TITLE sophica.